ORGANIC FARMING

A BOOKLET FOR SECONDARY SCHOOLS

INTRODUCTION
BY KITTY SCULLY

'When we are standing on the ground, we are really standing on the roof top of another world'

From the humble soil where it all begins, to plants, animals and human beings, farming and growing organically respects the interconnected relationship between all parts of the food production process. Organic farming offers a viable alternative to intensive agriculture holding the health and welfare of people, animals and the environment at its core. It is simple really and this book tells it as it is linking food production with its wider environment. With strong growth and increasing interest in the organic food and farming sector it is an important and exciting time to get involved.

I wish I had discovered this booklet "Organic Farming" when I was still at school. Thankfully I found my path of organic enlightenment in the end by enrolling on an Organic Horticulture course as a mature student and I have never looked back. Apart from all the fantastic land based projects I have worked on, my career in organic horticulture has broadened my mind and skillset immensely. I have met so many inspiring, hard working, good humored and sharing people along the way and I continue to enjoy visiting organic farms in Ireland and all around the world. Since the curative measures available in conventional agriculture are not a first port of call for organic growers, good management and attention to detail are skills quickly acquired. These are two skills that will see any person well through life.

As a professional organic gardener and teacher I often joke with my students, if you follow the instructions on the back of a seed packet, you are practically a qualified gardener. Well, the same can be said of "Organic Farming". There is enough factual information and food for thought and further exploration within this booklet to qualify everyone reading it as understanding what organic farming is all about. I have no doubt that this book will seed lots of new organic farmers and growers, and not a second too soon.

Welcome to the good life!

ORGANIC FREE RANGE CHICKENS

CLOVER TO ENHANCE SOIL FERTILITY

ORGANIC LIVESTOCK

Written by: Cathy Eastman, Ian McGrigor and Niamh Ní Dhúill.
This booklet has kindly been funded by the Department of Agriculture and the Marine.

ORGANIC GRAIN

CONTENTS

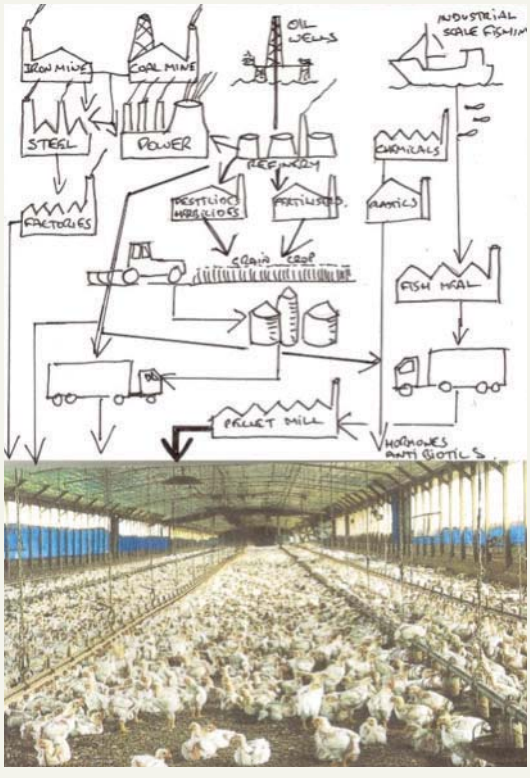
ORGANIC FARMING AND GROWING

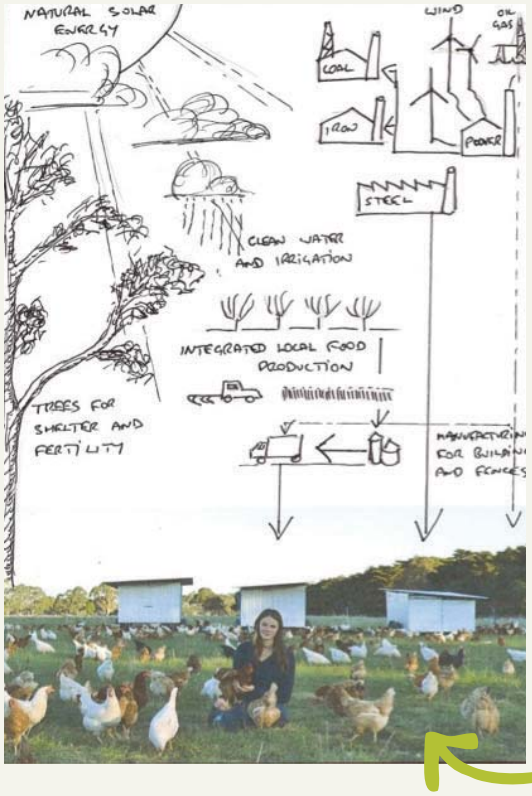
WHAT IS ORGANIC FARMING ?

Organic farming is a holistic farming system that works in harmony with nature rather than against it. The following concepts incorporate what it means to be an organic farmer:

- Farming with the environment.
  Understanding natural habitats and working with them.
- Understanding biodiversity.
- Nurturing the soil.
- Aiming to farm in a carbon neutral way.
  Adapting to climate change.
- Animal Welfare.
- Sustainable food production and seasonality.

COMPARING CONVENTIONAL FARMING TO ORGANIC SYSTEMS





DO WE HAVE A CHOICE ?

Which is the more sustainable system?

How are the inputs generated?

Which is the healthier egg?

LOOK AT THE PICTURES

What foods are produced organically in Ireland? Oats, barley, vegetables, dairy, meat , eggs, fruit.

What companies in Ireland certify organic food? IOFGA, Organic Trust, Demeter and Global Trust.

If the product has an organic symbol from any of the organisations listed, you are guaranteed that it has fully complied with Irish or European Organic Standards.

WHAT IS THE DIFFERENCE BETWEEN THESE 2 SYSTEMS ?

The number of organic farmers in Ireland is currently 1,725 or 2% of all farmers. Collectively they farm approximately 72,000 hectares of land organically.

The benefits of organic farming are: increased organic food production, less **pesticide residues**, increased soil fertility and health, increased biodiversity, lower inputs, locked up carbon, less **herbicide residues**, sustainable system of food production.

- **Split into small groups and discuss what are the benefits of Organic Farming. Bring back your ideas to the bigger group.**
- **With your group research the following topics and bring your information back to the group:**

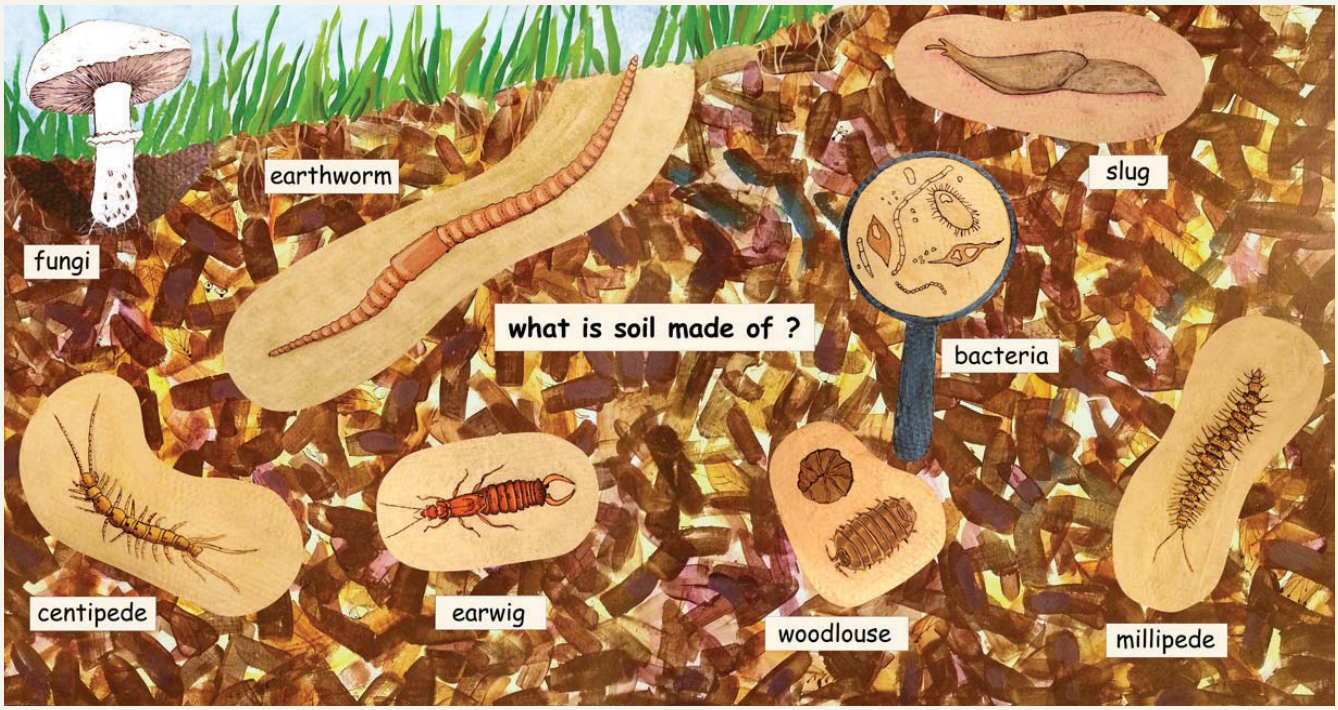
SOIL FERTILITY, BIODIVERSITY, CARBON SEQUESTRATION, SUSTAINABLE FOOD PRODUCTION

The pesticides that may remain on or in food after they are applied to food crops.

The herbicides that may remain in the soil or on plants after they are applied.

SOIL

The soil is a living entity; healthy soil has food, air and water to help plants grow. Living soils teem with life, from earthworms, centipedes and beetles to fungi and bacteria.



Most of the plant's nourishment comes from the soil. The nutrients are made up of minerals from the earth. Other nutrients come from dead plants and animals. As plants cannot use most of these nutrients directly, they have to be converted into a useable form by insects and organisms which live in the soil. In return plants help soil organisms by secreting sugars and enzymes back into the soil. The more nutrients available in the soil, the more the plant can take up. The more nutrients in the plant, the more these nutrients become available for animals and humans.

CROP ROTATIONS

Crop rotations are at the heart of organic farming and help organic systems to protect the environment. They involve changing the type of crop grown in one area on a regular basis. Organic farmers plant alternate groups of plants (roots, cereals, brassicas, legumes) to add fertility and prevent pests and diseases from building up.

ORGANIC FARMYARD MANURE

Crop Rotations

- **Help to control pests and diseases so help organic farmers to avoid the use of pesticides.**
- **Help to maintain soil fertility.**
- **Help to maintain soil organic matter levels and soil structure.**
- **Ensure that enough nutrients are available to different crops each year.**

ORGANIC MATTER – COMPOST, FARMYARD MANURE AND SEAWEED

Organic matter is added to the soil as a natural alternative to synthetic fertilisers, which are banned in organic systems.

It adds nutrients to the soil and also fibrous material that helps soil structure and provides 'food' for the insects and microbial organisms creating a healthy layer of humus full of soil life.

Returning manure from animals and compost from the residue of crops, food and other farmyard waste is a way of ensuring that nothing is wasted. It helps return nutrients to the soil, cover and protect the ground and promotes healthy soil life through the return of organic matter.

Manure is usually stacked or composted for six months before use, though it can be used fresh on grassland only.

Seaweed is used as a **soil tonic**. It contains low amounts of **nitrogen** and **phosphorus**, but is does have the full range of properties in it to improve your soil. As well as supplying bulk to condition the soil, seaweed contains around 60 **trace elements**, **growth hormones** and **nutrients**, and **fungal** and **disease preventatives**. Interestingly any soil imbalances, such as a deficiency of nitrogen, will be corrected by adding seaweed which will balance the soil environment so that **nitrogen fixing bacteria** are helped along.

LOCAL SEAWEED IMPROVES SOIL CONDITION

GREEN MANURES

Green manures are crops that are grown and then ploughed back in to improve the soil.

They provide ground cover when the soil is not being used for growing other crops – in between cultivations or over winter for example. This helps to prevent soil erosion and weeds establishing.

Legumes, such as clover, beans and vetch, 'fix' atmospheric nitrogen in their root nodules – capturing fertility from the air and eventually releasing it to the soil.

They support insect populations which provides more food for birds and more predators to reduce the number of pests on the farm.

When they are eventually ploughed into the soil they provide organic matter, which helps ensure a healthy soil life and maintains nutrient levels for the next crop.

GREEN MANURE CLOVER

WINTER VETCH GREEN MANURE

ANIMAL WELFARE

Organic standards put animal welfare first; they are designed to ensure that animals are kept in genuinely free range conditions and treated humanely. A healthy animal is better able to resist disease than a stressed one. Organic livestock farming aims to prevent disease from occurring by promoting health. This is achieved through appropriate diet, high standards for living conditions and keeping the animals in a low stress environment.

ORGANIC STANDARDS INCLUDE THE FOLLOWING:

Feed

The feed given to livestock should enhance their health and wellbeing.

Organic animals must be fed a diet that is as natural as possible using organic fodder that is not only good for growth and output, but also for health and welfare. Feed must not contain any substances that artificially promote growth, synthetic proteins or genetically modified organisms (GMOs).

EXAMPLE – FISH:

Organic farmed fish are produced using the most sustainable feeds available - salmon and trout feeds are made from the recycled processing wastes of fish which have already been caught for human consumption.

Only natural pigments are used in the feeds. The fat content of feeds is limited producing more natural growth rates and a higher quality end product.

Breeds

Organic farmers must choose breeds that are robust, able to adapt to local conditions and disease-resistant. Indigenous breeds and strains suited to specific environments are preferred.

It is recommended that the livestock chosen is suitable for the land type.

EXAMPLE – DAIRY COWS:

Because the typical high-yielding breed of black and white cows (Holstein-Fresian) cannot be reared for high quality meat production, it is common practice for male dairy calves (who can't produce milk in the future) to be killed at birth or exported to the continent for veal production.

Organic farmers often use high yielding crosses in dairy production but they are also encouraged to use other breeds. Options for organic farmers include raising native breeds such as a Red Poll or Shorthorn that has been bred for both milk and meat, or raising male calves for organic 'rose' veal - a robust, mature meat, pink in colour and aged for flavour.

Living Conditions

There are strict rules on the way in which animals are housed. Animals must have access to natural air and light, and must have access to fields (when weather and ground conditions permit) or be able to go outdoors.

The number of animals kept in one space must be appropriate to guarantee their comfort, this also helps to reduce stress and disease.

Tethering animals is not allowed unless it is essential for safety, welfare or veterinary reasons, and then only in individual cases.

EXAMPLE – BROILER CHICKENS:

Organic chickens being raised for meat (broilers) must be housed with room for a maximum of 10 birds per square metre. Conventionally-reared broiler chickens are normally housed in groups of up to 40,000 in a large shed.

Health and Disease Prevention

Keeping animals healthy and content is one of the key principles of organic farming.

Organic farming strengthens animals' natural defences, as it provides them with suitable high-quality feed, regular exercise and free-range access to appropriate pasture.

Organic animals must only be given drugs to treat an illness. Antibiotics are often routinely used in non-organic farming systems as growth promoters and to prevent disease, this is prohibited in organic farming.

The World Health Organisation has called for a reduction in the use of antibiotics in agriculture because of the risk to human health: due to the overexposure to antibiotics.

Organic animals cannot be given hormones which make them grow more quickly or make them more productive.

Homeopathy and herbal remedies are used widely in organic livestock management.

EXAMPLE – BEEF CATTLE:

Intestinal worms are a common problem in all cattle and can be avoided on organic farms by rotating the pastures and also allowing the calves to develop a natural immunity from their mothers. Rotating pastures means moving animals to different fields on the farm so that worms or disease problems do not build up on one particular field or area.

EXAMPLE – SHEEP

Organic farmers manage their flocks carefully to reduce the disease risk to new-born lambs and use clean grazing systems to minimise the need for worming. Clean grazing involves managing pastures so that sheep, and particularly lambs, are only put into fields that have very low or no worm infestation.

The big difference between organic and non-organic sheep systems are the methods used to prevent and control diseases. Non-organic sheep are likely to receive many more veterinary treatments than organic sheep. For example many non-organic lambs will be wormed every four to six weeks, regardless of whether they actually have worms or not.

Freedom from Pain

Organic farming ensures that any suffering is kept to a minimum throughout the animal's life. When animals are transported, their welfare must be guaranteed and travel times must be kept as short as possible. The use of any type of electrical stimulation or tranquillisers before or during loading and unloading is strictly forbidden. Slaughter methods are designed to be as quick and painless as possible.

EXAMPLE – PIGS:

To ensure animal welfare, several practices that are common in the non-organic pig industry are banned in organic farming;

- Nose ringing - this is used to prevent pigs from natural rooting behaviour.
- Tail docking - pigs in confined spaces often bite each others tails, so non-organic producers dock tails to prevent this.
- Farrowing crates - these are small metal cages only inches wider than the female pig, which are used around the time she gives birth to restrict her movement and prevent her from following maternal instincts.

★ **What do you understand by the term animal welfare?**
List two examples of how organic farming prioritises animal welfare.

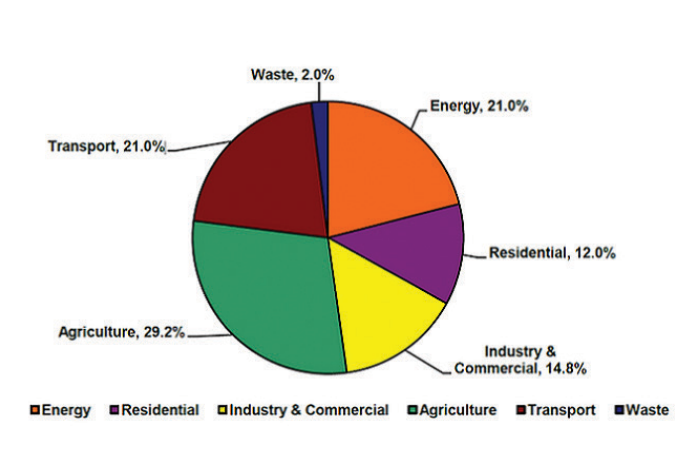
CLIMATE CHANGE AND FOOD PRODUCTION

WHAT IS THE STORY WITH CLIMATE CHANGE?

Basically, the earth's atmosphere is heating up, which is part of a natural process. But how we are living today is speeding up this natural cycle, mainly due to how we are using fossil fuels for energy and one of the biggest uses of energy is how we produce our food. Agriculture is the biggest contributor to our overall **greenhouse gas emissions at 29.2%**, and this does not even include all the food we import! The debates about climate change can go on forever but ultimately we need to make urgent changes to how we produce our food. We need to look at how we can mitigate climate change through food production.

What affect is our farming and food production having on Climate Change?

In Ireland, how we are farming and growing our food represents 1/3 of our climate/carbon footprint. Conventional agriculture production relies heavily on cheap fossil fuels for its inputs to maximize yields and to transport them over long distances, for example artificial fertilisers, pesticides, energy, transport, packaging. Fossil fuels are not renewable, their cost is increasing. Ireland as a country is at the end of the supply chain.



Ireland's Greenhouse gas emissions by sector for 2009 (Source: EPA 2011)

- What would we do if the oil and oil based products stopped coming in from abroad?
- How would we produce our food?
- How would we feed ourselves?
- How can we make sure that Food Security is being tackled as well as Climate Change?
- What effect is Climate Change having on how we produce our food?

IRISH GROWN ORGANIC VEGETABLES

CLIMATE CHANGE AND FOOD PRODUCTION

The average household spends 16.2% of their budget on food and has shown a steady decline over the past 30 years. So people want to spend less money on food – is this sustainable in the long run? How can a farmer producing food organically and sustainably have the potential to make a living if the consumer wants the food to be cheaper all of the time? Currently 10 calories of oil produces 1 calorie of food. Is this sustainable? [1]

It is projected that the cost of climate change to Irish Agriculture will be €1-2 billion per year by the middle of this century. This is not sustainable. Food production needs to be part of the solution, not part of the problem. Producing food organically and sustainably has the potential to make a huge difference. But it will involve a big shift from how we produce our food today. The main difference is that we have to move away from the outdated methods that depend completely on cheap oil to produce cheap food. Cheap food production is an illusion as there is a hidden cost to the environment and humanity, which we are seeing today through climate change and the degradation of our natural habitats, biodiversity, clean water, air and soils. [2]

Is Organic Farming and Growing more Resilient to Climate Change?

Organic farming is a **solution multiplier**. This means that it creates many solutions from it's actions. It emits less carbon as it uses fewer inputs. It sequesters (locks up) a larger amount of carbon in soils. It creates habitats and increases biodiversity. It uses water more efficiently and uses less energy. It is less reliant on cheap fossil fuel and looks for sustainable solutions to food production. It uses appropriate technology that has a low impact environmentally, such as habitat creation, crop rotations, green manures to fix nitrogen, compost and manures, soil regeneration, biochar, integrated pest management, open pollinated seeds and seed diversity: crop and plant diversity.

Community Supported Agriculture is a great way to guarantee the farmer has a market for produce and localises the food supply for the customer.
Research: Find out about the Skerries Community Harvest Group and how their system works:
(https://skerrieschg.wordpress.com/about-us-2/)

DO SOME RESEARCH AND PROJECT WORK TO FIND OUT MORE ABOUT CLIMATE CHANGE AND FOOD PRODUCTION ....

1. How can we make adaptations to prepare for Climate Change?
2. What does Climate Change Mitigation mean?
3. What does Carbon Sequestration mean?
4. How could Agro-Forestry help tackle Climate Change?
5. How can Short Term Coppicing systems be integrated into farms as a way to mitigate Climate Change?
6. How does the Governments' Harvest 2020 plan to deal with climate change and is it a sustainable solution?
7. Is Organic Farming a sustainable solution?
8. Can Organic Farming feed the world?
9. How can Small Scale Agro-Ecological farms help tackle Climate Change?

BIODIVERSITY

What is Biodiversity?

Biodiversity is the variety of life on earth and all the connections between all living things. It can also be called the Web of Life. It is essential for sustaining the natural living systems that provide us with food, soil, clean water, clean air, fuel, health, wealth, and other services we take for granted in our everyday life.

Why is Biodiversity important?

We completely depend on biodiversity for life, health and our very survival. Organic farming and growing systems are shown to increase the diversity of plants, insects and animals in their area.

How do our farming and growing systems affect Biodiversity?

The use of artificial fertiliser depletes soil of the living organisms that create humus. Insecticides kill beneficial insects. Herbicides kill weeds that are useful in an organic system, eg. nettles, cleavers. Their use is a short-term solution that has serious consequences, both visible and invisible. The food chain becomes contaminated with these poisons which work their way through to higher predators (such as birds of prey) and eventually affect human health. Bird population is considered an indicator of pesticide and other pollution. "Populations of farmland birds in Europe, which indicate the health of the ecosystem as a whole, have declined by almost 50% in the past 25 years" according to **Birdlife International** (on their website: www.birdlife.org)

Do organic methods of farming and growing benefit biodiversity?

Organic systems tend to have more varied habitats than conventional farms, including hedgerows, woodlands, wetlands, ponds and meadows. Studies have shown that species of plants and insects are more abundant and diverse in organic systems.

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Organic farming encourages increased species diversity and the development of natural pest management, according to much research and it has been found that compared to conventional farming, organic farming practices are better for biodiversity. [3]

An average of 30% more species inhabit organic farms, eg, birds, butterflies, soil microbes, beetles, earthworms, spiders, plants, vegetation and mammals. As herbicides and pesticides are not used, their population densities are higher. Many weed species attract beneficial insects that improve soil quality and forage on weed pests. [3]

Bacteria populations in the soil are higher in organic systems, as natural manures and composts are used to fertilise the soil, and this in turn leads to improved soil health and food production. Beneficial soil microbes and increased mycorrhizae have been shown to give higher yields than conventional farming. [3]

NATIVE ELDER TREE FLOWERS

GREATER BIO-DIVERSITY ON ORGANIC FARMS

FROGS NEED PONDS TO BREED

Research has shown that organic farming benefits insect biodiversity, insect-flower interactions and pollination of wild plants. [3]

The research demonstrated that insect-flower interaction networks on organic farms were larger, and that there were more flowers on organic farms which attracted a higher number of bees, compared with non-organic and conventional counterparts. [4]

According to the National Biodiversity Data Centre in 2010, the goods and services provided by biodiversity are estimated to contribute a minimum of €2.6 billion per annum to the Irish economy. Agriculture, forestry, fisheries and tourism depend to a large extent on this natural capital and therefore it is essential to preserve and enhance it. [5]

★ **Research a project on biodiversity in Ireland using the following two websites:**

www.irishwildflowers.ie

www.biodiversityireland.ie

CASE STUDY:

Pat Mulrooney, one of the farmers whose organic dairy farm was used for the research, was delighted with the results. "It verifies my own personal observations over the years as an organic farmer. We began exploring organic farming in the mid 1970's and obtained organic certification with IOFGA in 1987. I have noticed a cumulative build up of species diversity on the farm and now this research confirms that we made the right choice to farm organically. We now know that the ecosystem on our farm is healthier and additional research on organic milk is also showing that organic milk is healthier for humans than non-organic milk so it is a win-win scenario. We need to have more organic farmers in Ireland producing food which sustains all species".

THINK ABOUT WHERE YOUR FOOD COMES FROM

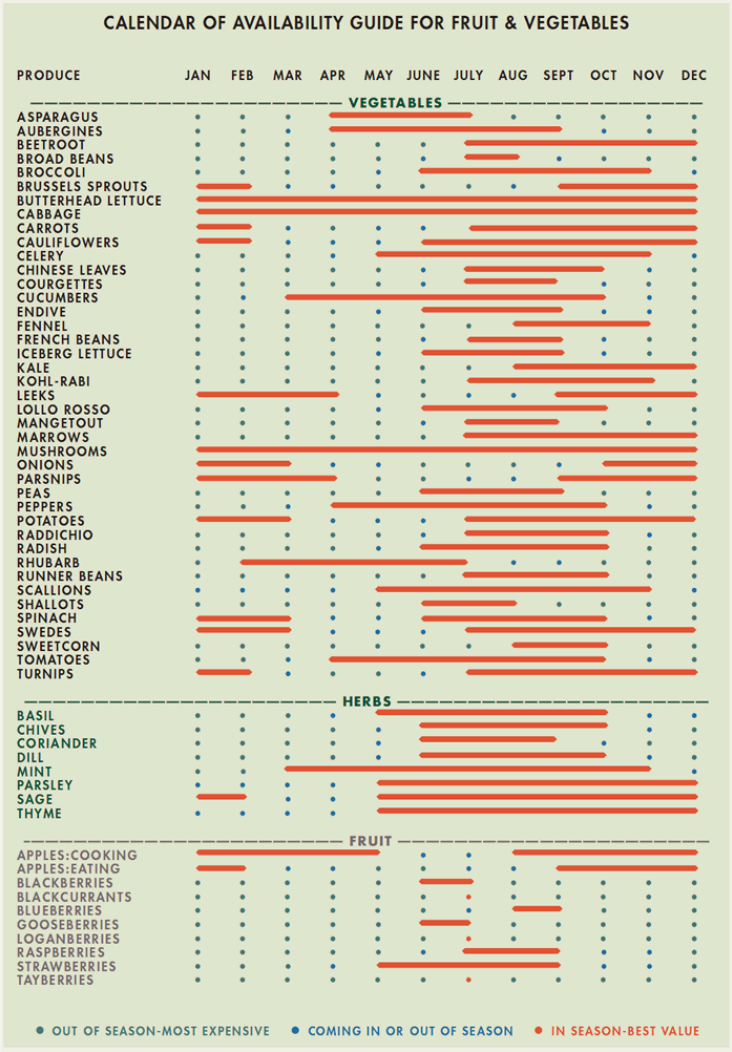
Questions to get debate started with class:

What is the current world population?
What is the projected population 2050?
How much of your food is produced locally?
How much organically?
How much of your food is imported?
By air or by sea?

Meat production uses 11 times more land than vegetable production. What is the effect of ever expanding meat production on our natural habitats?

SEASONALITY OF FOOD

- Why is buying food that is in season important?
- What impact does it have on your carbon footprint and climate change?
- Discuss the benefits of local food and organic food.



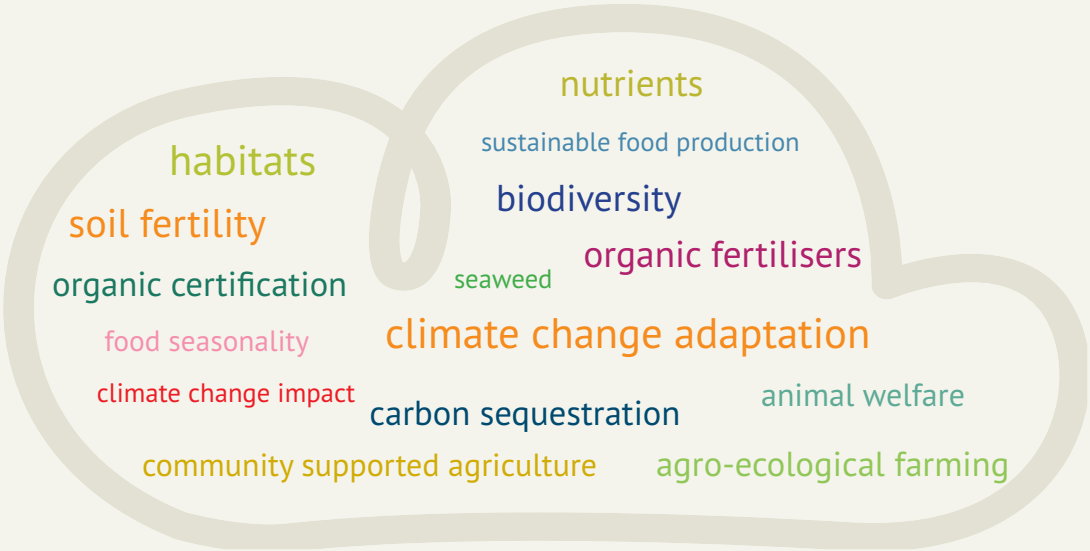
[6]

WORDS CONNECTED TO FOOD PRODUCTION

THE WORDS....

..... ADD YOUR OWN WORDS.

ORGANIC FARMING



★ **Generate a survey to question your class about their awareness of where their food comes from.**

PRACTICAL SCHOOL PROJECTS

These projects are cross-curricular spanning from Science, Home Economics, Geography, Agricultural Science, CSPE.

There are lots of projects that can be done connecting the school to organic farmers and growers.

PRACTICAL OUTDOOR PROJECTS

Start a school organic garden

Invite your local organic farmer to your school to talk about organic farming and growing

Plan and design the school grounds to be a place where biodiversity and food can be grown

Contact your local organic farmer and ask to visit their farm

MORE IDEAS

- Plant a herb patch
- Harvest and dry herbs to make herbal teas
- Put up a polytunnel
- Harvest rainwater
- Plant an orchard
- Plant a native woodland
- Plant a native hedge
- Plant an edible hedge
- Grow some soft fruit bushes
- Grow a wildflower meadow
- Grow a grain, harvest it and make bread with it
- Grow a willow structure
- Make a wildlife pond
- Create a food and habitats nature trail around the school grounds
- Carry out bug hunts and pond dipping
- Identify all the trees in the school grounds
- Make bird and bat boxes for the school grounds
- Start a beehive in the school garden
- Keep chickens in the school garden
- Record bees and butterflies in the school grounds

PRACTICAL SCHOOL PROJECTS

INDOOR PROJECTS

Find out what foods are produced locally to you?

Find out what cannot be produced locally and why?

Compare the production of organic milk with conventional milk

Compare the production of organic grain with conventional grain

RESEARCH PROJECTS

- Can organic farming and growing feed the world?
- Can conventional farming feed the world in a sustainable way?
- Find out about small scale organic projects in Ireland and around the world.
- What is the real cost of food production? Look for the hidden costs. What does cost mean? Is the cost high to the environment and human health? Are we thinking about cost in monetary terms only?
- Research why conventionally produced food is so cheap.
- Measure the food miles of your dinner - as individuals, as a class and as a whole school.
- Visit your local farms and farmers markets.
- Try to have a 50 mile meal.

RESOURCE LINKS:

Explore the links below to find out more about
Organic Farming and Food Production.

- http://www.agriculture.gov.ie/farmingsectors/organicfarming
- www.iofga.org
- http://ec.europa.eu/agriculture/organic
- www.organictrust.ie
- *The Year Round School Organic Garden – available from* www.gortbrackorganicfarm.com
- http://www.bordbia.ie/consumer/aboutfood/organicfood/pages/organicfood.aspx
- www.irishseedsaversassociation.ie
- http://cloncannonbiofarm.com
- www.foe.ie/justoneearth/carboncalculator
- www.irish-climate.org
- www.irishenvironment.com/blog/intergovernmental-panel-on-climate-change-ipcc-5th-report-up-yours
- www.climatechange-foodsecurity.org
- http://www.trocaire.org/whatwedo/climate-change

WATCH THE FOLLOWING CLIPS ON YOUTUBE

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

https://www.youtube.com/watch?v=m9aHf1ZRQwo

https://www.youtube.com/watch?v=CYI1hk7kcBc

SOURCES:

[1] http://www.thejournal.ie/average-weekly-household-expenditure-in-ireland-is-e810-384042-Mar2012
[2] http://www.stopclimatechaos.ie/download/pdf/projected_economic_impacts_of_climate_change_on_irish_agriculture_oct_2013.pdf
[3] http://www.glenisk.com/why-organic/organics-and-the-environment/organic%20and%20the%20environment,%20biodiversity
[4] http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2664.2010.01949.x/abstract
[5] http://www.biodiversityireland.ie/about-us
[6] http://www.bordbia.ie/consumer/aboutfood/veg/pages/seasonalavailabilitychart.aspx

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Organic Farming and Growing is a holistic system to produce food that works in harmony with nature rather than against it. This is a short booklet to introduce you to the concepts and theories behind organic farming with the aim that it will increase your awareness about the benefits. You will find information about the following topics:

- Farming with the environment.
  Understanding the natural habitats and working with them.
- Understanding the importance of biodiversity.
- Nurturing the soil.
- Farming in a carbon neutral way. Adapting to climate change.
- Understanding the needs of animal welfare.
- Sustainable food production and seasonality.

Department of Agriculture, Fisheries and Food
An Roinn Talmhaíochta, Iascaigh agus Bia