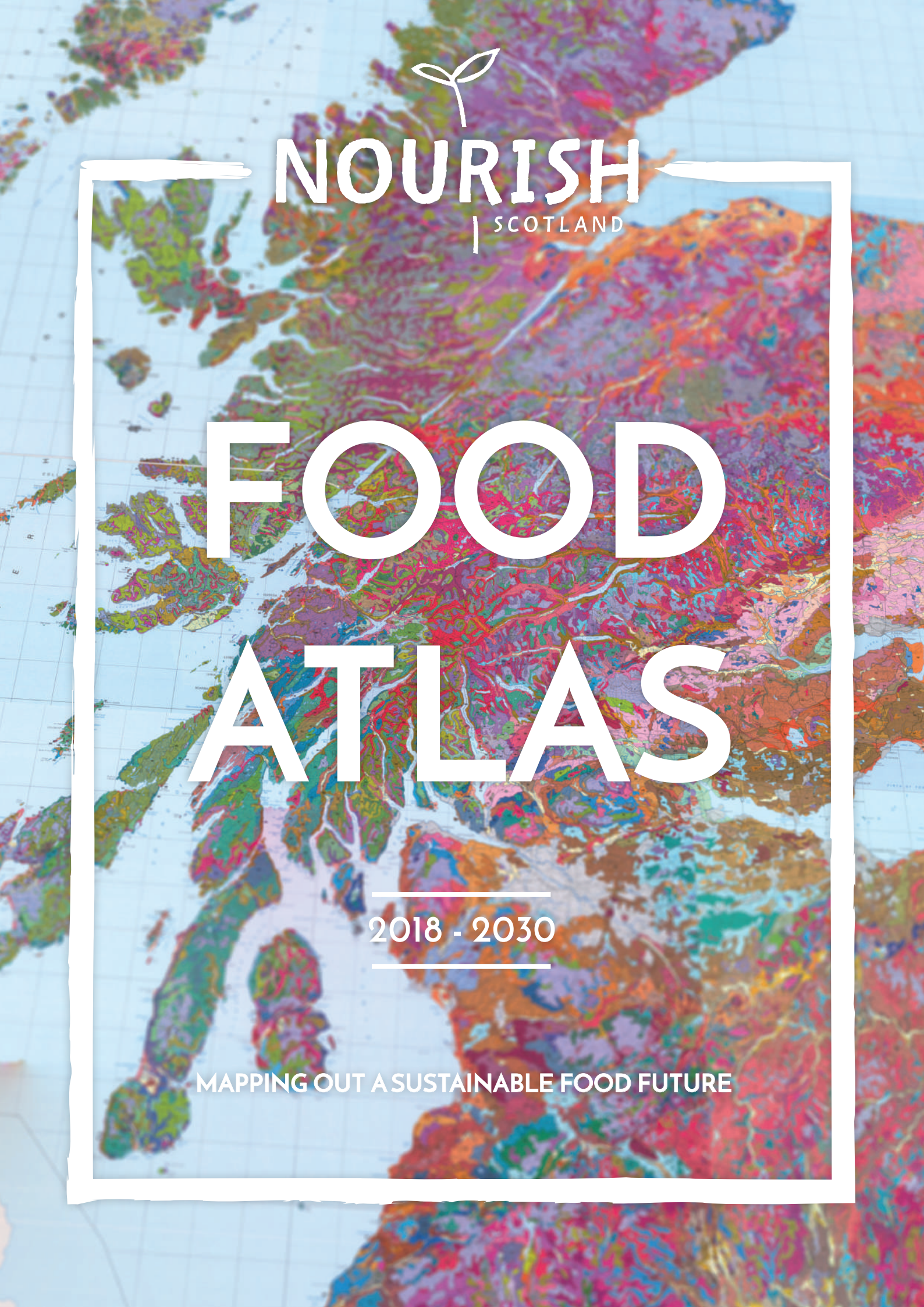

NOURISH
SCOTLAND
FOOD
ATLAS
2018 - 2030
MAPPING OUT A SUSTAINABLE FOOD FUTURE

SCOTLAND'S FOOD ATLAS

NOURISH

Nourish Scotland is a food justice organisation. We take a 'systems approach' to food, recognising that food insecurity, climate change, public health, biodiversity, workers' rights, animal welfare, access to land, and waste, are all interrelated and all urgent. We are working for a fundamental transformation of Scotland's food system because by understanding the food system as a system, we can more accurately diagnose issues and implement solutions that deliver progress across the board.

We believe in a rights based approach to food – your capacity to eat well should not depend on the money in your pocket, and our collective capacity to feed ourselves into the future should not be compromised for private profit. We believe we can work together to make change happen, but that we must work to change the structures: it should be easy to do the right thing with food – whether that is for our health and wellbeing or our environment.

www.nourishscotland.org

NOURISH SCOTLAND

DATA BY DESIGN

Data By Design is a graphic design start-up working to communicate evidence and data in beautiful ways. We combine experience advocating for change with creativity, graphic design and an understanding of statistics and big data.

We are working for a better future, environment and society, and we are always interested in new projects that will help us get there.

www.data-by-design.co.uk

DATA BY DESIGN

CONTENTS

SCOTLAND'S FOOD ATLAS

NEEPS AND TATTIES? IRN BRU AND TUNNOCKS TEACAKES? PORRIDGE? SMOKED SALMON? HAGGIS? THIS SCOTTISH FOOD ATLAS IS NOT WHAT YOU MIGHT EXPECT.

The next 26 pages will map out food in all its aspects, an atlas of Scotland's entire food *system.*

A system of **many actors**: from microorganisms in our soils, to birds overhead, fish in the seas, growers, meat packers, chefs, and a whole lot of eaters.

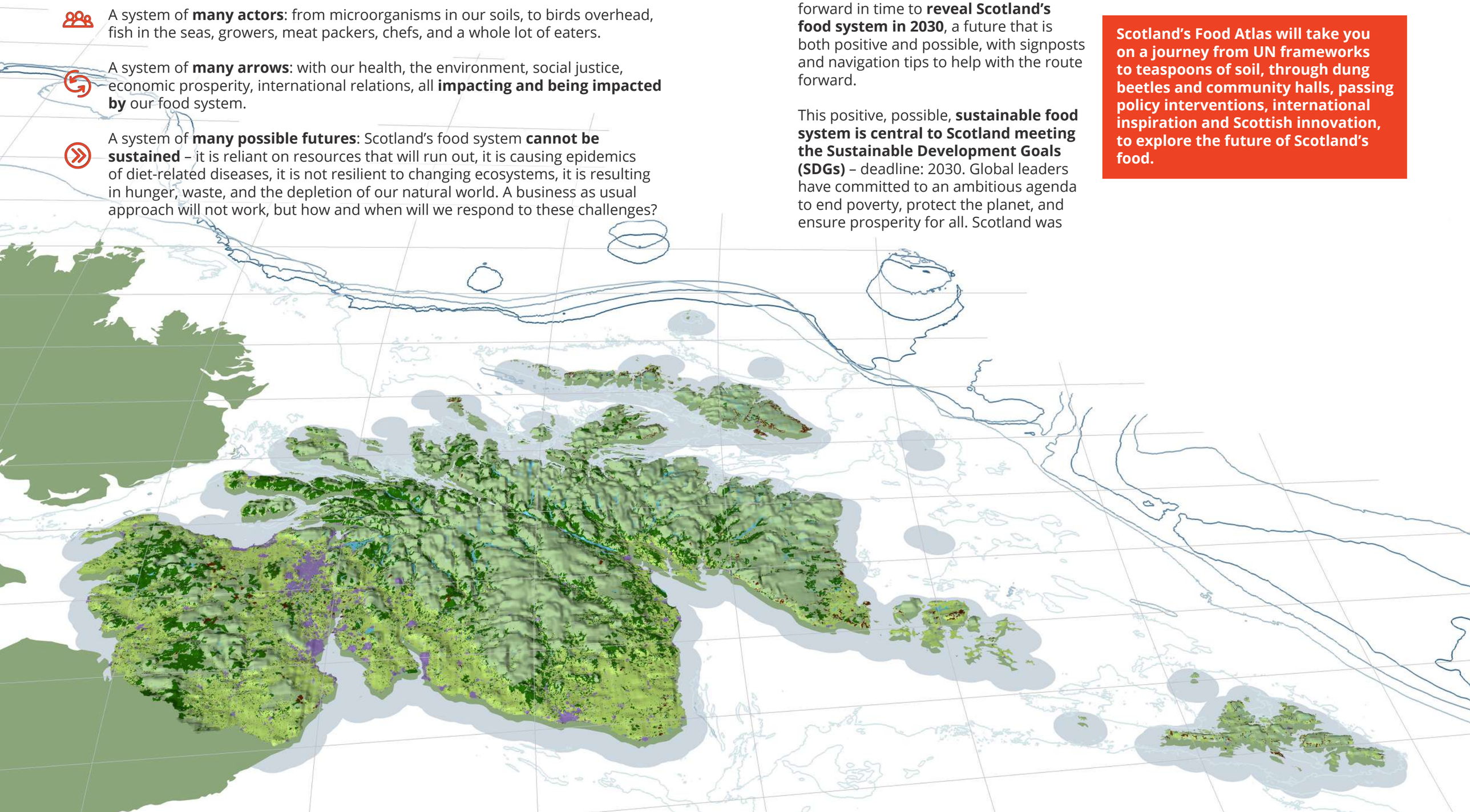
A system of **many arrows**: with our health, the environment, social justice, economic prosperity, international relations, all **impacting and being impacted by** our food system.

A system of **many possible futures**: Scotland's food system **cannot be sustained** – it is reliant on resources that will run out, it is causing epidemics of diet-related diseases, it is not resilient to changing ecosystems, it is resulting in hunger, waste, and the depletion of our natural world. A business as usual approach will not work, but how and when will we respond to these challenges?

This Food Atlas will map out not only 13 different elements of Scotland's food system, but also a possible future, a more sustainable future, for each. What does a sustainable food system look like? How do we get there? The Atlas will race forward in time to **reveal Scotland's food system in 2030**, a future that is both positive and possible, with signposts and navigation tips to help with the route forward.

This positive, possible, **sustainable food system is central to Scotland meeting the Sustainable Development Goals (SDGs)** – deadline: 2030. Global leaders have committed to an ambitious agenda to end poverty, protect the planet, and ensure prosperity for all. Scotland was one of the first countries to commit to the SDGs, but to really show leadership our action must match our aspirations. If we are to inhabit a more equal and sustainable planet in 2030, we need to reorient our food system, starting today.

Scotland's Food Atlas will take you on a journey from UN frameworks to teaspoons of soil, through dung beetles and community halls, passing policy interventions, international inspiration and Scottish innovation, to explore the future of Scotland's food.



OUR RIGHT TO FOOD - 2018

We all have a right to be able to eat well, and a right to a fair and sustainable food system. But the way we do food policy now does not help to deliver this right.

This means that in Scotland, in 2018, many people go without food, or are unable to access nutritious and culturally appropriate food where they live. At the same time, food production in Scotland has considerable environmental and climate impacts that undermine our ability to continue producing food in the future, and many of the people who work in the food system have precarious jobs.

We need joined-up policy making that prevents things getting worse, and enables progress towards a fair, healthy and sustainable food system.

Our current model of food governance is unable to achieve this: we govern food in silos, often overlooking the interconnections between poverty and health, health and production, or production and poverty. This makes it challenging to ensure rights are protected and progressed.

The food rights model joins up food systems governance and sets a clear direction of travel. It enables us all to have better access to information on the state of the food system, more opportunities to participate, and where needed the ability to access justice.

THE RIGHT TO FOOD MEANS MAKING SURE FOOD IS;

AVAILABLE ACCESSIBLE ADEQUATE

In Scotland agriculture and associated land uses is the **SECOND LARGEST** emitter of greenhouse gases

2016 figures showed it accounted for **26%** of Scotland's emissions

46% of fresh food sold in the UK contains pesticide residue.

This has almost doubled from in the last decade **24%**

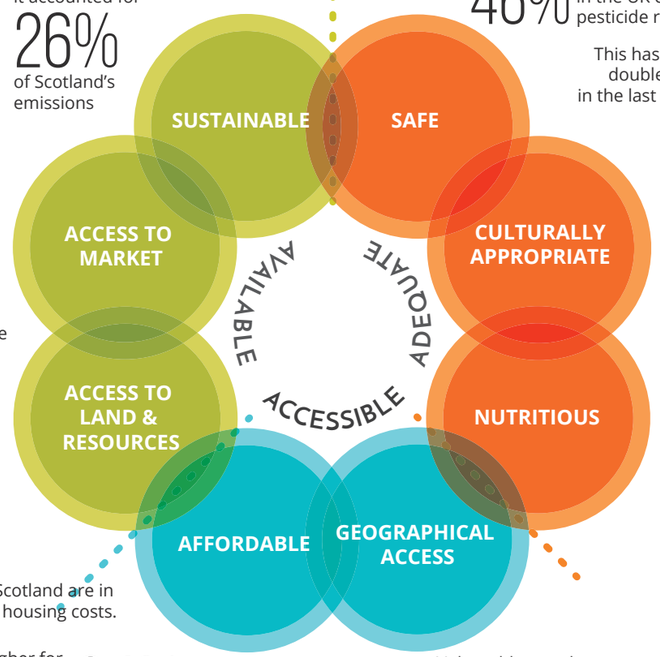
Farm incomes have fallen by since 2011 **46%**

45% of farms did not make enough to pay the farmer the Minimum Agricultural Wage

1,000+ aspiring & current farmers said that access to land posed a significant barrier to farming in a 2017 survey.

19% of people in Scotland are in poverty after housing costs.

The figures are higher for households with children: are in relative poverty after housing costs **24%**



In 2018 there are over **200** food banks distributing food parcels in Scotland. This figure does not include other forms of food aid, for example community meals or soup kitchens.

We have consistently failed to meet Scottish Dietary Goals since monitoring began in **2001**

Vulnerable people are not supported: by all Meals on Wheels services will be phased out in Scotland. **2019**

WHAT IS THE RIGHT TO FOOD?

The right to food is a well-developed body of international human rights law and practice.

At its core is the belief that everyone has the right to be able to eat well, and to a fair and sustainable food system. Responsibility for progressing towards this rests with government.

Article 11 of the International Covenant on Economic, Social and Cultural Rights is one of the main human rights instruments protecting the right to food. The UK Government signed and ratified this Covenant in 1976 but, unlike other human rights instruments, did not incorporate it in to domestic law. This means that food rights are not embedded in our law, policy, or practice, and cannot be enforced. The Scottish Government has the power to change this.

OUR RIGHT TO FOOD - 2030

By 2030, the right to food is protected in Scottish law, and is embedded in policy and practice.

Everyone in Scotland has enough money to eat well, and it is easy to access nutritious sustainable food. People who produce food in or for Scotland are treated fairly, food production works with nature and is on its way to being carbon-neutral.

This has been made possible because the Scottish Government, local authorities, and all public bodies have developed action plans for progressing food rights.

An independent food commission keeps the pressure on Government by reporting annually to Parliament on progress against these plans and on statutory targets – these targets are aligned with the Sustainable Development Goals.

Where government proposals or private sector developments threaten food rights, the Commission issues recommendations on how to avoid regression. This information is available to all, enabling us to collectively participate in holding government to account.

FIVE STEPS TO GET US HERE

1. Incorporate the right to food in Scots Law

Putting food rights on a statutory footing will embed protection and progression of the right to food at the centre of all relevant decisions, and enable access to justice if rights are not respected.

2. Create an independent statutory body

A statutory Food Commission will scrutinise relevant policy and legislative developments against the right to food, and report annually against statutory targets on the state of the food system.

3. Establish a cross-cutting national food plan

Ministers will periodically outline a cross-cutting plan to progress the right to food and achieve statutory targets across the food system, similar to the legal frameworks for climate change and land use.

4. Place duties on all public bodies

Public bodies will have a responsibility to progress food rights, including the objectives outlined in the national food plan.

5. Set sectoral measures and targets

These specific programmatic measures and statutory targets will stimulate immediate action, they will be aligned to the Sustainable Development Goals.

CASE STUDY: BRAZIL

Brazil is a world leader in the protection and progression of the right to food.

In 2006, the Brazilian Government passed a framework law on food, joining up policies on social security, health, education, farming and labour. In 2010 the right to food was added to the Federal Constitution. Between 1990 and 2015, the percentage of the population suffering from hunger dropped from 14.8 per cent to 1.7 per cent.

Brazil's policies and programmes focused on three key issues:

Universal access to healthy food through expanded social security programmes, free school meals and community restaurants.

Tackling malnutrition and obesity through the promotion of healthy foods, integrating nutrition actions in the national healthcare system, and a national breastfeeding policy.

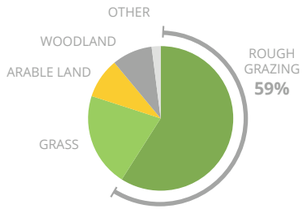
Healthy and sustainable food production through training, technical and financial support for producers, public procurement reform, guaranteed prices for basic foods and farmers' markets in urban centres.

OUR LAND - 2018

We have a lot of land in Scotland, but there is still competition for how we use it. Whether land should be woodland or pasture, golf courses, allotments or housing developments is up for debate, with the consequences felt far and wide. Local wildlife, communities on the other side of the globe, and future generations are all impacted by how we use our land here today. Climate change, pollinator populations, social justice and the sustainability of natural resources are all intimately intertwined with land use decisions.

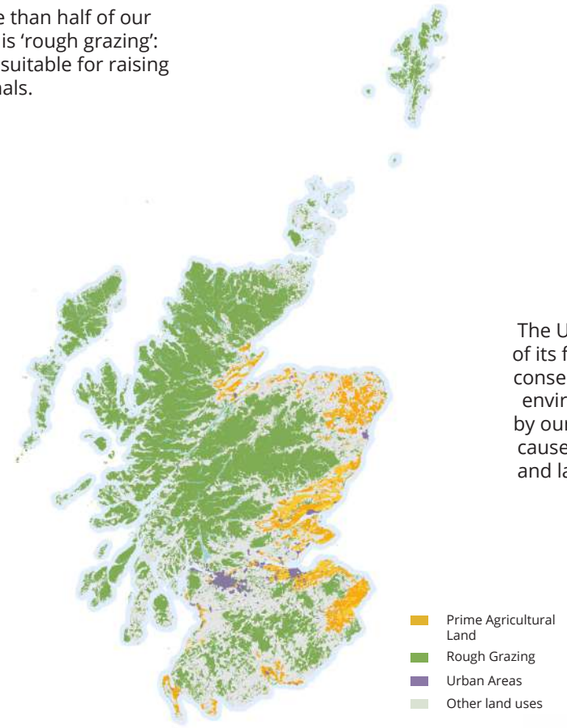
Monocrops cover most of our limited crop area, primarily growing grain for the whisky industry. Meanwhile, we are reliant on land in other countries to feed ourselves, with imports of food and animal feed steadily rising. Much of the rest of our land is given over to wild deer and grouse populations on gaming estates, which limit the potential for native forestry and put pressure on our ecosystems. There is little diversity in the people who have access to land in Scotland: few young people and women, and no data is collected on ethnic diversity. The price of agricultural land in Scotland has risen sharply in the last decade, especially for good arable land, making buying land very difficult for most new entrants.

WE ARE NOT MAKING THE BEST USE OF OUR LAND



More than half of our land is 'rough grazing': only suitable for raising animals.

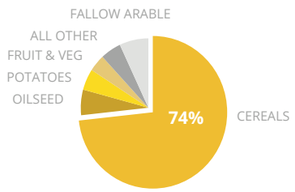
Only 9% of our agricultural land is suitable for growing crops, and we use very little of it for human nutrition.



Map created using data James Hutton Institute Land Capability for Agriculture, and the Historic Land Classification datasets.

The UK imports more than half of its food and animal feed. As a consequence, around 2/3 of the environmental impacts driven by our diets are located abroad, caused by intensive agriculture and land use change (including deforestation).

We use 3/4 of our good land to grow cereals, of which around **1/2 goes to livestock feed** and almost **1/3 to beer and whisky.**



100 calories of feed are needed to produce only 17-30 calories in meat.

CHANGE IS COMING

- In March 2015, regional land use pilot projects took place in Aberdeenshire and the Scottish Borders on land uses such as agriculture and forestry which fall outside the statutory planning system. This demonstrated that regionalised land use frameworks enable collective and integrated decision-making, which helps to achieve other public priorities.
- The Land Reform (Scotland) Act 2016 established a Land Rights and Responsibilities Statement to inform policy and practice, and created a Scottish Land Commission. The Commission works to create a Scotland where everyone benefits from the ownership, management and use of the nation's land and buildings.
- In June 2017, Scotland's First Minister established a Women in Agriculture Taskforce to recognise and seek to address inequalities in the farming and agriculture sector – particularly in leadership roles.
- A Scottish Farm Land Trust is being set up. This new organisation will seek to increase access to land for small-scale, ecological agriculture by purchasing land to be held in trust and rented fairly to new entrants and young people.

OUR LAND - 2030

We view land as a public resource, and treat access to land for sustainable food production as an economic and cultural right. The land reform agenda has promoted sustainable development and enabled genuine community empowerment. There is age, gender, and ethnic diversity amongst the custodians of land in Scotland. There is also diversity in the food we produce – we are integrating crops in agroecological systems, and combining livestock with forestry.

Urban spaces are food producing places too; previously derelict land, as well as gardens and public parks across the country are used to grow fruit and vegetables and to keep bees, chickens, and pigs for food. Native woodlands are recovering and enjoyed by humans and wildlife alike. Reductions in deer, grouse and sheep populations have allowed more diverse ecosystems to thrive in our uplands. This combined diversity has brought many win-wins: it means we can produce good food – and enough of it – whilst also protecting our wild spaces and habitats, allowing nature and society to thrive.

FIVE STEPS TO GET US HERE

1. Regional land use frameworks are produced and integrated with the National Planning Framework. This strategic and rights-based approach to the management and use of land enables us to meet public priorities including on health, environment and climate change.
2. Planning regulations protect prime agricultural land from development, and sustainable food production is made a priority for public land.
3. Farm support facilitates sustainable, mixed and profitable farming, with specific provisions to encourage agroforestry.
4. Public procurement provides a secure market for high quality Scottish food, enabling farmers to focus on producing good food in environmentally friendly ways.
5. Access to land empowers both rural and urban communities. Investment to enable models of access such as farm land trusts helps new entrants and young people to enter farming, and promotes a greater diversity of farm sizes and outputs.

CASE STUDY: TERRE DE LIENS

Terre de Liens in France is an organisation set up in 2003 to develop farming networks and practically support access to land for ecological agriculture. It has enabled over 200 farmers to establish businesses on land (partially or fully) owned by the trust. This has been made possible through the support of 12,000 people who have contributed €58 million in investment and €2.8 million in donations.

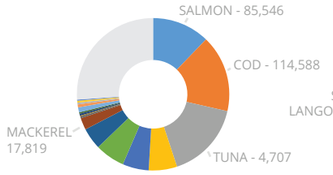
Terre de Liens and farmers agree on a specific type of agricultural lease that includes legally binding environmental protection clauses. In addition to buying land and leasing it to farmers, Terre de Liens also brings communities together with farmers, local authorities and other stakeholders jointly defining and managing land use. They emphasise the importance of building a movement that sees land differently.

OUR SEAS - 2018

Scotland's seas are an important part of our culture and economy. Our seafood is diverse and a healthy source of protein, and both our fishing communities and marine environment are very important to our Scottish culture. Yet, we are not looking after them nor valuing their offerings. Unfortunately, many of the issues which beset the food system on land persist in the sea too.

The rise of industrial fishing fleets has driven down many of our fish stocks, while making others (such as inshore herring) commercially unviable. New forms of fishing have emerged to fill the void, including scallop dredging, electrofishing and trawling for scampi. In recent decades we have also seen a massive expansion in aquaculture - fish and shellfish farming. Some of it, such as mussel and oyster farming, is relatively benign, however, salmon farming has grown massively in Scotland causing significant environmental damage by releasing large amounts of chemicals, effluent and sea lice into the marine ecosystem.

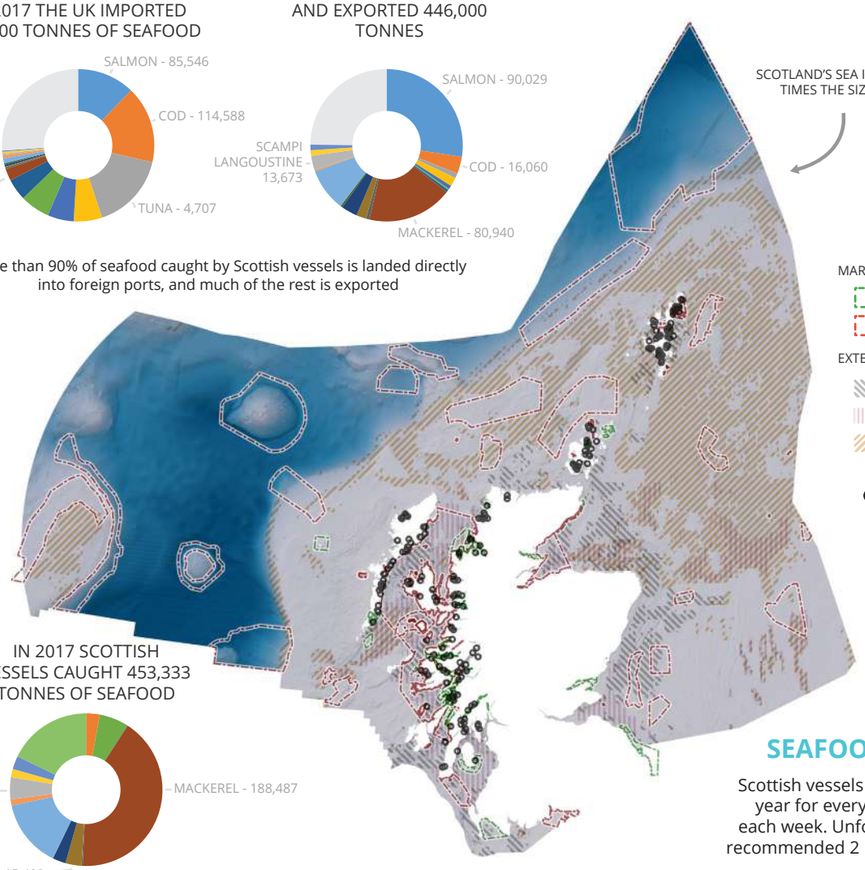
IN 2017 THE UK IMPORTED 701,000 TONNES OF SEAFOOD



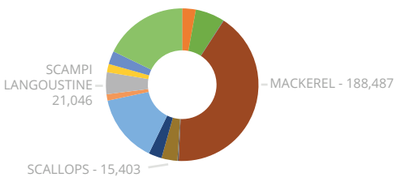
AND EXPORTED 446,000 TONNES

More than 90% of seafood caught by Scottish vessels is landed directly into foreign ports, and much of the rest is exported

SCOTLAND'S SEA IS AROUND SIX TIMES THE SIZE OF ITS LAND



IN 2017 SCOTTISH VESSELS CAUGHT 453,333 TONNES OF SEAFOOD



SEAFOOD TO SUSTAIN US

Scottish vessels catch enough seafood each year for everyone to eat a dozen portions each week. Unfortunately, few of us eat our recommended 2 portions, or 160g, per week.

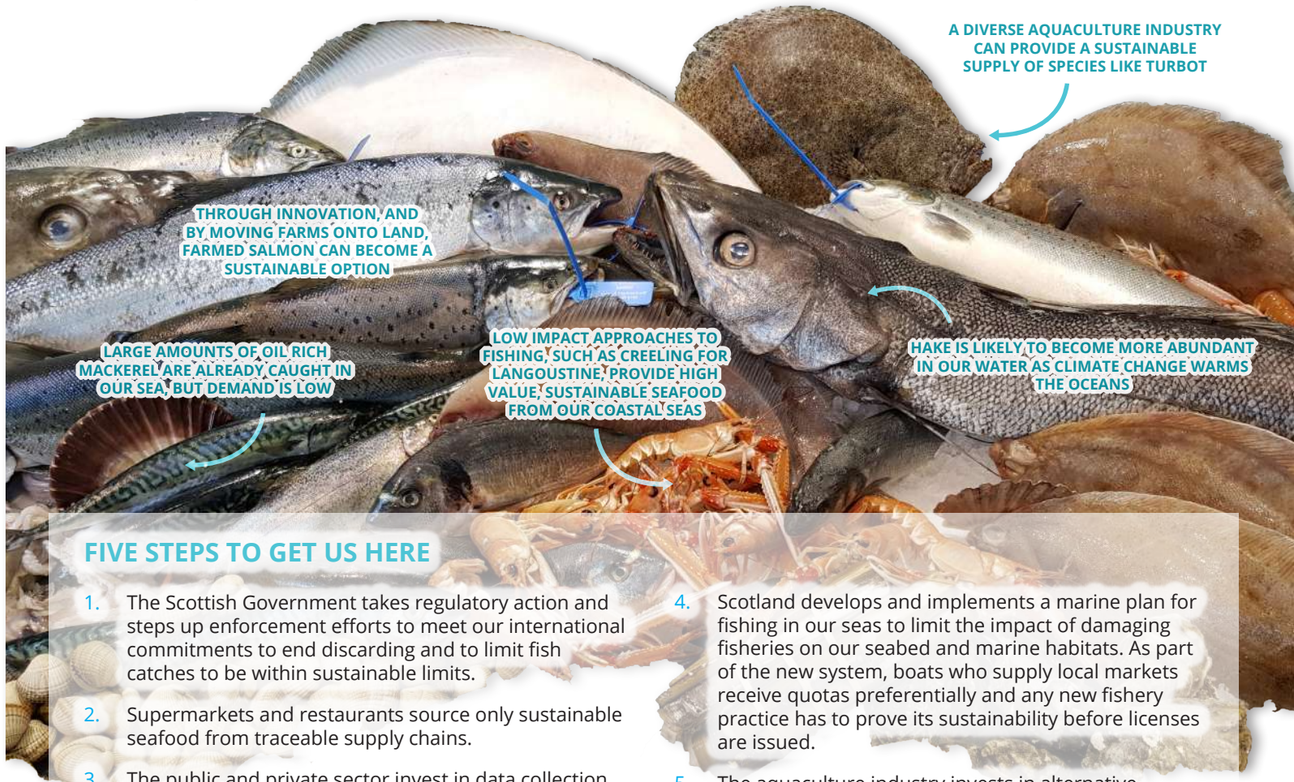
CHANGE IS COMING:

- In the 1980s and 1990s politics finally caught up with shrinking fish stocks. The response was to significantly curb the impact of fishing on some stocks, and we are beginning to see the signs of recovery in response to these changes, in particular in our offshore fish stocks.
- In response to a demand for high quality, sustainable and traceable seafood, a number of small scale industries have set up around our coast fishing in selective ways, such as by hand diving, and providing a high quality seafood product.
- In 2010 Scottish Parliament passed the Marine (Scotland) Act, which not only required that Scottish Government establish a network of Marine Protected Areas (MPA), but also that they protect and, where appropriate enhance, the health of our seas in their overall management of it. We are still awaiting 4 MPAs and the proper implementation of the Act, however, when the commitments are fulfilled, our seas should benefit.
- Several retailers are now committed to no longer source seafood from High Risk sources.

OUR SEAS - 2030

By 2030 everyone in Scotland eats 2 portions of sustainable seafood a week, which contribute to varied and balanced diets and help us keep healthy hearts. Scottish seafood is sold preferentially to Scottish consumers and the better quality and sustainability of Scottish caught seafood means we are less reliant on foreign imports. Sustainability and the protection of marine environments are now key priorities in how we manage our seas: fish stocks are healthy, we are no longer discarding fish at sea, and the marine ecosystem and seabed have recovered.

Scotland's aquaculture industry, no longer dominated by salmon farming, is diverse and resilient, producing a wider range of premium quality fish, shellfish and seaweeds. Aquaculture is fully integrated within the marine planning system and supports rural communities. Fishing and coastal communities are doing better too, as sustainable fisheries provide good jobs and attract tourism.



FIVE STEPS TO GET US HERE

1. The Scottish Government takes regulatory action and steps up enforcement efforts to meet our international commitments to end discarding and to limit fish catches to be within sustainable limits.
2. Supermarkets and restaurants source only sustainable seafood from traceable supply chains.
3. The public and private sector invest in data collection on fishing activity, including what is caught and where, such that fisheries managers can take informed and transparent decisions on how to sustainably manage our seas.
4. Scotland develops and implements a marine plan for fishing in our seas to limit the impact of damaging fisheries on our seabed and marine habitats. As part of the new system, boats who supply local markets receive quotas preferentially and any new fishery practice has to prove its sustainability before licenses are issued.
5. The aquaculture industry invests in alternative technologies to diversify the industry, including the use of closed containment systems (on land or at sea) and better feed to address the environmental impacts of Scottish salmon farming.

CASE STUDY: UNITED STATES OF AMERICA

40 years ago, partly in response to the collapse of the Grand Banks cod fishery, US Senators Warren Magnuson and Ted Stevens worked together to develop US legislation which, for the first time ever, took control of the oceans around the US out to 200 miles from the coast. The legislation was also tasked with managing fisheries, and over the 40 years has been adapted and improved. In 2006 it set out a clear requirement that fish catches should be restricted to biological limits, and that any state exceeding these would face legal consequences. The results have been stark, with 39 stocks rebuilt since 2000, and only 9% of US fisheries overfished.

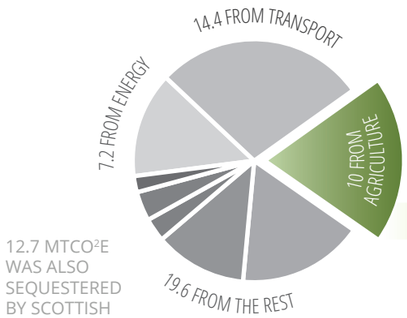
However, whilst this is a Federal piece of US legislation, implementation is down to individual states who can deliver their own management. Decision are made by formally engaging stakeholders including actual fishers themselves, the industry (including processors and the suppliers of seafood), NGOs and the public (via elected representatives). Successes include the North-east Rotational Scallop fishery, which aims to maximise scallop catch, whilst closing areas to protect seabed habitats, bycatch species and juvenile scallops. Areas are closed to scallop fishing in rotation, to protect large concentrations of small scallops, and are identified on the basis of information from fishing vessels catches. The result is a fishery worth around $424million.

OUR CLIMATE - 2018

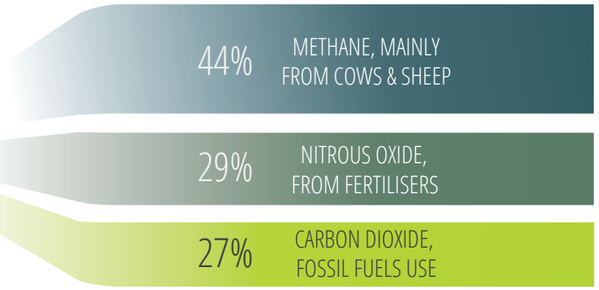
Climate change has already had a significant impact on agriculture across the globe. It is affecting the earth's temperature, precipitation and hydrological cycles, which means droughts and floods are evermore common and producing food is an increasingly unpredictable business. At the same time, agriculture – and the whole food system – are significant contributors to climate change.

Scotland was one of the first countries to introduce Climate Change legislation in 2009; we have national and international obligations to reduce our greenhouse gas emissions. Our agricultural emissions account for the food we produce in Scotland, not what we consume. It means that we do not discount the emissions caused by the production of food for export – such as barley for whisky and Scottish lamb – nor do we account for the embedded emissions of our food imports – which are a considerable portion of our dietary climate footprint.

SCOTLAND EMITTED
51.2 MTCO²E IN 2016

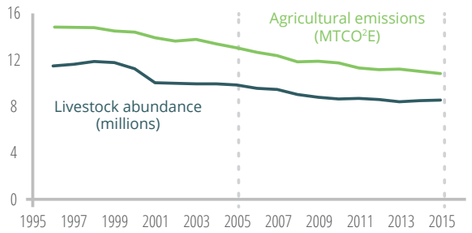


AGRICULTURAL EMISSIONS COME FROM A VARIETY OF SOURCES



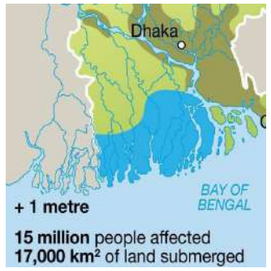
Since 1990, emissions from Scottish agriculture have fallen by 25.8%; however, during that time numbers of cattle have fallen by 15% and sheep by 33%. Our farming has been slow to respond to the challenge of climate change.

SCOTTISH LIVESTOCK & EMISSION TRENDS



FOOD SECURITY IN A CHANGING WORLD

Around the world, climate change is increasing levels of food insecurity. More extreme weather events such as droughts and floods, warmer temperatures, changes to rainfall patterns, and increases in crop diseases all pose a significant challenge to food security.



Fast sea level rise in the Bay of Bengal in Bangladesh is forcing many farmers to migrate away from their homes, due to lack of freshwater and rising salinity levels affecting arable land. Millions of people will be displaced over the next decade or two because of salinity, tidal surges, flooding, and the cyclones that regularly hit the region.

CHANGE IS COMING:

- A coalition led by WWF is challenging businesses, public bodies, and citizens to take action for better forest and habitat conservation, food production and consumption, and land use, and commit to deliver up to 30% of the climate solutions needed by 2030. Signatories of this 30x30 Forests, Food and Land Challenge include Unilever, PwC, the City of San Francisco, and several national Ministries.
- Agroecology has been promoted by several global institutions as the only way we can feed ourselves sustainably into the future, including by the United Nations and the European Commission. It is already practiced by small scale producers around the world.
- Many businesses are taking the lead on delivering the Paris Climate Change Agreement and the Sustainable Development Goals, for example the British Retail Consortium has a commitment to reduce and eliminate deforestation by 2030, and Mars has committed to ambitious emissions reduction targets and to investing $1billion in tackling climate change.
- A 2016 social attitudes survey found 29% of people in the UK were reducing their meat consumption (primarily motivated by health concerns but resulting in lower dietary greenhouse gas emissions).

OUR CLIMATE - 2030

By 2030 every farm in Scotland produces renewable energy and sequesters carbon in soils, making a key contribution to reducing greenhouse gas emissions. Agroecological farming is the new normal, which means applying the principles of ecology to food production. This new approach has made the sector more profitable and resilient, thanks to healthy, diverse ecosystems and better recycling of nutrients, which foster natural pest control and rich soils.

Beyond the farm gates, our food habits have changed, enabling a shift to a re-localised food system and less and better meat consumption and production. This has significantly reduced our dietary carbon footprint at home and abroad. Sequestering carbon and fostering healthy ecosystems is also a key priority in our management of woodland and peatland. All in all, this means in 2030 our greenhouse gas emissions are only a quarter of what they were in 1990. Although the impacts of climate change are something to contend with, a strong emphasis on diversity in ecosystems is mitigating the damage.

Aphodius nemoralis.

Dryops luridus.

A mix of multiple species of dung beetle reduces the greenhouse gas emissions associated with cattle farming by around one third. In 2030, the conservation of diverse dung beetles is a key part of healthy ecosystems management with consequent reduced emissions from livestock.

FIVE STEPS TO GET US HERE

1. Agroecology is declared the farming method of the future, with all education, training, advice and funding directed towards the transition to agroecological food production.
2. Compulsory nitrogen accounting and soil testing for farmers ensure efficient use of fertilisers and better recycling of nutrients, reducing emissions of nitrous oxide.
3. Less and better meat in all public kitchens forms one part of a wider cultural shift towards reduced meat consumption.
4. Every farm receives advice to produce a tailored Climate Change Plan, and subsidies support the costs of implementing mitigation and adaptation measures, including agroforestry and habitat restoration.
5. Peat extraction is halted and vast areas of peatland are restored, creating large carbon sinks and wildlife rich habitats.

CASE STUDY: FRANCE

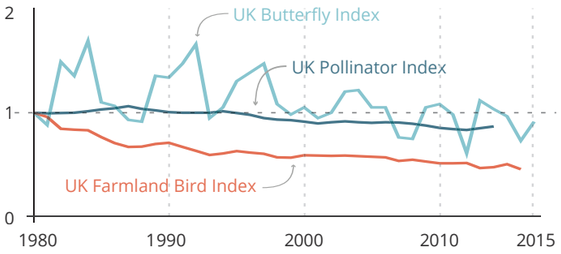
In 2014, France introduced a new legal framework for agriculture, which recognised the twin benefits – for the economy and the environment – of the widespread adoption of agroecology. Stephane Le Foll, the agricultural Minister who spearheaded the law stressed that it was principally about training future farmers differently.

In 2014, the French state employed over 200 new researchers and tutors to teach agroecology across the country as a core part of the national agricultural educational programme. Education now promotes crop diversity, biodiversity, ecological pest management and integrated mixed farming as the cornerstones of successful food production.

OUR BIRDS, BEES, BEETLES & BUTTERFLIES - 2018

The world today has fewer chirping birds and fluttering butterflies than a generation ago. The heavy use of insecticides, fungicides and herbicides, overuse of artificial fertilisers, climate change, and the destruction of habitats for farming or buildings, are having a lethal impact on ecosystems.

As well as the pleasure of living in a world of wild and wonderful creatures, we are extremely reliant on other species to allow our human society to function. Many wild plants are the source of our medicines, and insects pollinate most of our food crops, keep pests afar, and improve our soil quality alongside earthworms. We do not even know a fraction of the species we share the world with, but we do know that the more species we lose, the less productive, efficient and healthy our environment will be.

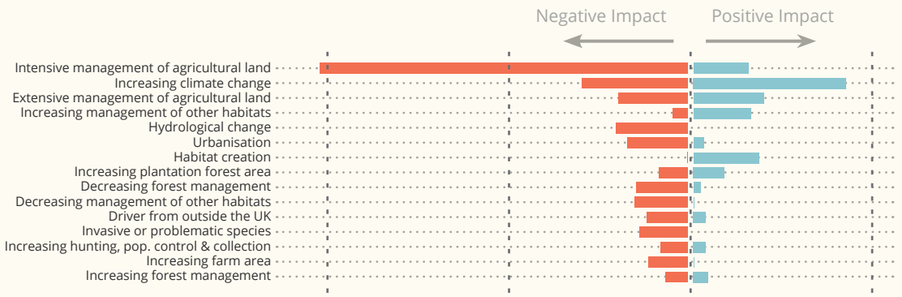


42% of land species in Europe have declined in the past decade, we may lose two thirds of species by the end of the century.

We have **44 million fewer** birds in Britain than in 1970; populations of farmland birds have **fallen by half** in this time.

The biomass of insects has fallen by **76% since 1990**, according to a study in Germany with similar patterns likely elsewhere. **75%** of crops on the planet benefit from insect pollination.

WHAT IS AFFECTING OUR BIODIVERSITY?

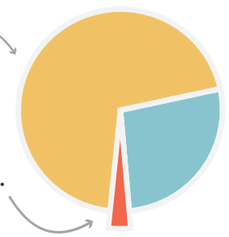


While the impact of climate change and other land use drivers on biodiversity is mixed, **conventional agriculture** is the single largest driver of biodiversity decline in the UK.

SCOTTISH AGRICULTURE LEAVES LITTLE SPACE FOR WILDLIFE

73% OF SCOTLAND'S LAND IS AGRICULTURAL.

BUT ONLY 2.2% OF THAT AREA IS IN ORGANIC MANAGEMENT.



94% of our soft fruit crops and **98%** of our arable crops are sprayed with pesticides. Soft fruits producers are reducing their use of pesticides (**8kg/ha** in 2016, down from **14kg/ha** in 2014), while arable farmers applied **3kg/ha** to crops in 2016 (a slight increase on previous years).

We use **too much nitrogen fertiliser** which runs off from fields and affects the make-up of wild plants, with those that thrive in nutrient-rich environments becoming more dominant and **others disappearing**.

CHANGE IS COMING:

- In May 2018, the European Union banned neonicotinoids, also known as neonics (with an exemption for closed greenhouses). Neonics are insecticides first introduced in the 1990s, which have been linked to the decline in pollinators, particularly bee populations.
- In 2010, a global agreement was made to tackle biodiversity loss over the next decade, the United Nations Aichi targets. Progress is not fast enough, but there are some things going well in Scotland, for example 23% of terrestrial and inland water areas and 18% of marine areas had been brought under site protection, exceeding these specific Aichi targets.

OUR BIRDS, BEES, BEETLES & BUTTERFLIES - 2030

In 2030, our food production works in harmony with ecosystems in the wider landscape. We have drastically reduced our use of pesticides and artificial fertiliser and live in a wildlife rich country, with species that were once in critical danger now flourishing.

Balanced, rich ecosystems help regulate conditions on farms, providing protection against diseases and flooding, maintaining the quality of air and soil, and reducing the need for pesticides with natural pest control.

Ladybirds feed almost exclusively on aphids.

There are only roughly 1,200 singing male corncrakes in Scotland. Numbers fell to 480 in 1993 due to changing agricultural practices.

Lapwing numbers in Scotland have fallen by 29% since 1987.

FOUR STEPS TO GET US HERE

1. A new farming support system which fosters biodiversity on farms by promoting agroecological practices and rewarding farmers who take steps to support wildlife.
2. Greater restrictions on pesticides use on all public land and taxation of pesticides according to their environmental load.
3. Increase of wildlife protected areas, both terrestrial and marine.
4. Co-production of research on healthy agricultural ecosystems with farmers, land managers and academics.

Ground beetles eats slugs and snails.

CASE STUDY: DENMARK

The Danish Government has a strong track record of tackling agricultural pollution. Prompted by concerns around human health and environmental damage, reducing nitrogen pollution and pesticides use from agriculture is high on the political agenda.

Over the last 30 years, Denmark has halved nitrogen pollution without reducing agricultural output. This success was achieved through a mix of progressive measures, including information, regulation, and financial incentives, and enabled by good understanding of the hotspots of nitrogen loss summarised in the Danish nitrogen budget.

Denmark has also taxed pesticides for agricultural use since 1996. In 2013, the tax was reformed to be based on indicators of external costs: human health risks, toxicity to non-target species, and polluting potential. As a consequence, the most harmful pesticides have seen large price increases.

OUR SOIL - 2018

There is a largely unseen world beneath our feet, buzzing with life. One gram of soil can contain more bacteria than there are people on earth. Thousands of other species live in soil – the highly visible ones like earthworms and dung beetles and the tiny protozoa and nematodes.

Soil doesn't just hold our plants up and nourish them: through the fungal networks in soil, plants communicate to share resources and defend against predators. Healthy soils capture and filter water. Despite this fundamental relationship of reliance between human and soil, we too often take soil for granted.

LOSING SOIL

Globally we are losing approximately

36 BILLION

tonnes of topsoil every year.

Soil is essentially a non-renewable resource, as it takes thousands of years for an inch of new soil to form. Deforestation, monocultures, and climate change are dangerously increasing the fragility of soils, causing degradation and erosion. This is not only happening far away, driven by the pressures from our unabated demand for agricultural products such as soy bean and palm oil, but also here, as we saw after the large floods in 2014.

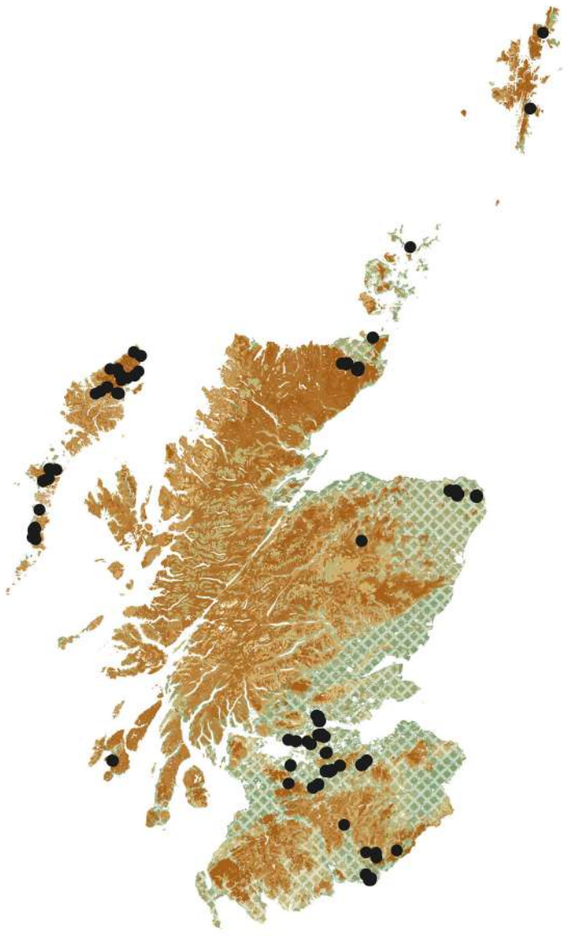
LOSING SOIL CARBON

We have lost between

25% - 75%

of the carbon - or organic matter - in our soils since the industrial revolution.

The world's soils still hold more carbon than all the trees and the atmosphere put together. However, the way we've managed our soils in the last 300 years has released almost as much CO_2 as all the burning of fossil fuels.

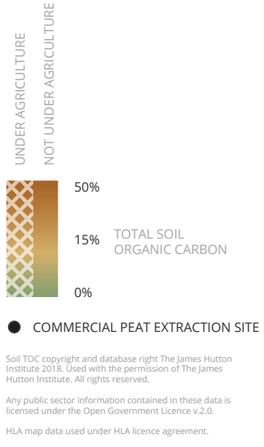


LOSING SOIL STRUCTURE AND QUALITY

1/5

of topsoils in surveyed catchment areas were found to have severe structural degradation.

This was found in a study of Scotland's soils in winter 2015/16. Such degradation reduces soils' productivity and their capacity to store water, increasing the risk of flooding, erosion, and nutrient run off.



CHANGE IS COMING:

- The Scottish Government committed in its 2018 Climate Change Plan to restoring 40% of peatlands by 2030 – an area about twice the size of Fife.
- The '4 per 1000' initiative launched at COP21 by the French Government highlights the role of agricultural soils in mitigating climate change and recommends practices such as agroecology and agroforestry. Increasing the amount of carbon matter in soils by 0.4% per year could stabilise concentration of CO2 in the atmosphere. Around 40 countries have signed up to the initiative.
- Scotland is a world leader in soil science, and recently helped to produce the Global Soil Organic Carbon map . This interactive map provides very useful information to monitor and improve soil conditions, and mitigate and adapt to a changing climate through soils.

OUR SOIL - 2030

Soil has gone up the agenda in agriculture and in climate policy. Farmers now talk about their soil as much as gardeners. They are rewarded for increasing soil organic carbon, and many arable areas are now showing a positive carbon balance through incorporating more organic matter.

Agroforestry has taken off in Scotland; the integration of trees with grazing and with cropping is locking up carbon, reducing run-off and improving soil quality. All farmers are getting the soil pH right to make best use of fertilisers. The peatland target has been exceeded, with verified carbon savings helping to accelerate restoration efforts.

FIVE STEPS TO GET US HERE

1. Scotland signs up to the '4 per 1000' initiative and soil carbon sequestration becomes a key element in climate mitigation policy and in the new farm support system.
2. All farms develop and implement 5-year soil plans as part of their eligibility for agricultural subsidies.
3. Advisory services and agricultural teaching programmes adopt a 'soil first' approach to their work, ensuring existing and new farmers understand the importance of soils and keep abreast of new expertise and best practice.
4. Targets are set in Scottish law for 20% of arable land to be in organic management and 5% of all agricultural land to be managed using agroforestry practices by 2030.
5. A voluntary carbon trading scheme for farming is developed, helping the sector as a whole achieve ambitious soil carbon sequestration targets.

We can improve and look after our soils by reducing the amount of compaction it incurs from machinery and livestock, increasing the amount of plant and animal matter going back into fields, encouraging worms and other organisms to grow in our soils, and covering up bare soil with continuous cover crops.

These simple steps can make a meaningful improvement to the health and future prospects of our soil.

CASE STUDY: AUSTRIA

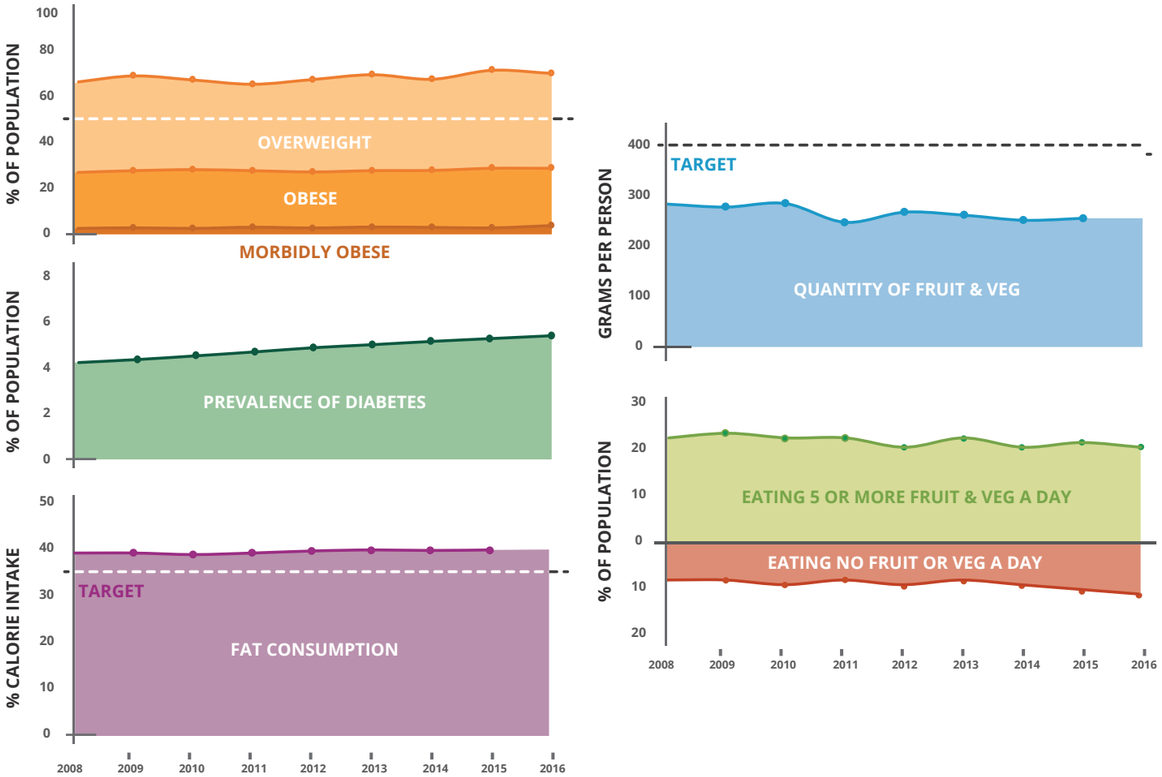
The humus building project in Austria run by Ecoregion Kaindorf rewards farmers who verifiably increase soil carbon. Companies which want to offset their emissions buy 'humus' credits through a voluntary carbon trading scheme.

200 farmers currently take part, earning on average €300 per hectare per year, with some achieving double that amount. Farmers also take part in training and knowledge exchange. Improved management practices have resulted not only in extra income but also in higher yields.

OUR HEALTH - 2018

If you designed a food system to ensure everyone can eat well and stay healthy, it would look very different to the one we have today. The industrial food and farming model has prioritised healthy profits, leading to mass production and mass marketing of ultra-processed foods, chemically-intensive agriculture and the development of long and deregulated global commodity supply chains. Consequently, our 'food environment' promotes and normalises unhealthy diets. We have an intergenerational health crisis, with individuals, communities and institutions undermined by poor health and diet-related diseases putting an unsustainable pressure on the NHS. Good nutrition is as important for our mental health as our physical health. Diets poor in vitamins, minerals and antioxidants can have long-lasting and wide-reaching health implications.

OUR HEALTH & DIET ARE POOR AND NOT IMPROVING



DIABETES ACCOUNTS FOR

10%

OF NHS SCOTLAND'S BUDGET. 5.4% OF SCOTLAND'S POPULATION IS DIAGNOSED WITH THE CONDITION

THE AVERAGE SCOTTISH ADULT EATS ONLY

3

PORTIONS OF FRUIT & VEG A DAY

OBESITY IS THE 2ND BIGGEST PREVENTABLE CAUSE OF CANCER - LINKED TO

13

COMMON FORMS OF CANCER

CHANGE IS COMING:

- The Scottish Government have made a commitment to halve childhood obesity by 2030, and to transform the food environment, including through restrictions on the promotion of junk food to children.
- Rather than telling people to eat their five a day, UK wide initiative Peas Please is working with businesses across the supply chain to make it easier for everyone to eat veg.
- The UK Government introduced a 'sugary drinks tax' in 2018, and a reformulation programme to reduce sugar in food across the board.

OUR HEALTH - 2030

In 2030, there has been a significant dietary shift towards vegetables, fruit, whole grains and plant-based proteins and away from sugar, ultra-processed food and meat. There has been a deep shift in our food culture, with a very different food offer in our public spaces such as visitor attractions, trains, sports venues and festivals.

Our high streets offer plentiful choices of delicious and nutritious food; new regulations ensure the food offer out there meets our national dietary goals. Businesses have responded to this new direction of travel to provide fresh and minimally processed food.

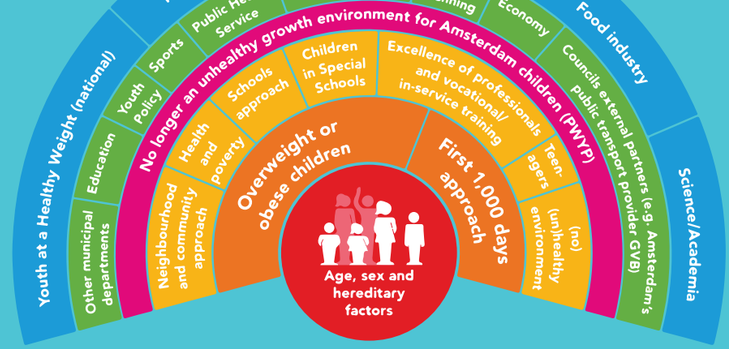
There is more emphasis on the social and cultural aspects of eating rather than simply food as nutrients.

FIVE STEPS TO GET US HERE

1. The Scottish Government adopts a whole of society, whole of government approach, with clear goals and visible leadership, nationally and locally.
2. Policy-makers use regulation, taxation, and investment to transform our food environment.
3. Local Authorities, community group, and grocers collaborate to make vegetables and fruit available and affordable for all.
4. Policy-makers engage with people who are affected by the problem in co-production models.
5. The catering profession and companies spearhead the change of culture through leadership by example.

CASE STUDY: AMSTERDAM

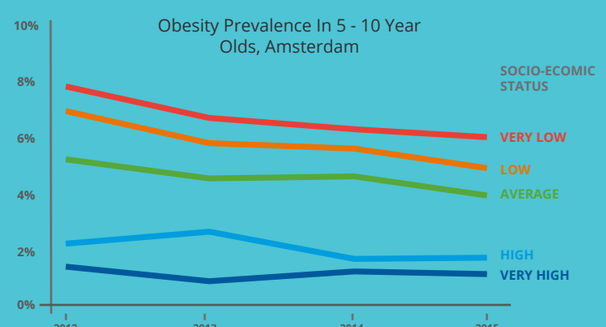
THE AMSTERDAM 'RAINBOW MODEL' ON CHILDHOOD OBESITY



In 2013 Amsterdam started work to address the structural causes of childhood obesity. Rather than consider it solely a public health matter, the new strategy requires all departments to contribute through their policies, plans and day-to-day working.

Areas for action include a healthy urban design, a healthy food environment; working with schools; and a focus on the first 1000 days (from the start of pregnancy until age two). Actions so far have included a ban on advertising that promotes unhealthy food to children on the Amsterdam metro, and work with retailers to change store layouts and stock healthier food.

Interdepartmental working parties have been established for each pillar of the strategy to integrate across departments and services and engage with businesses, NGOs, community groups, as well as people affected by the problem.



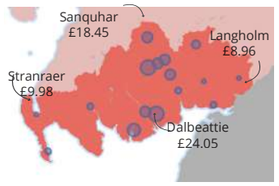
OUR COMMUNITIES - 2018

Communities have been the first responders to the food insecurity that a decade of austerity has brought. There are over 200 food banks across Scotland regularly donating food parcels to people who cannot afford to eat. There are hundreds more community food initiatives, ranging from community meals, growing projects, and school holiday clubs.

At the same time, the food needs of our communities are an afterthought in development planning and agricultural policy. Our immediate built environment shapes our food choices. Many people live in areas where they cannot access nutritious food easily, or affordably. Those areas often also see an over-representation of unhealthy foods. No amount of food education can overcome the barrier of having to take three buses to buy some vegetables. Agricultural policy in Scotland pays little attention to Scotland's consumption needs – most of the food produced here is exported. Little of the food we have access to is produced or processed near where we live.

IT'S ABOUT MORE THAN FOOD

COST OF SHOPPING AROUND DUMFRIES & GALLOWAY



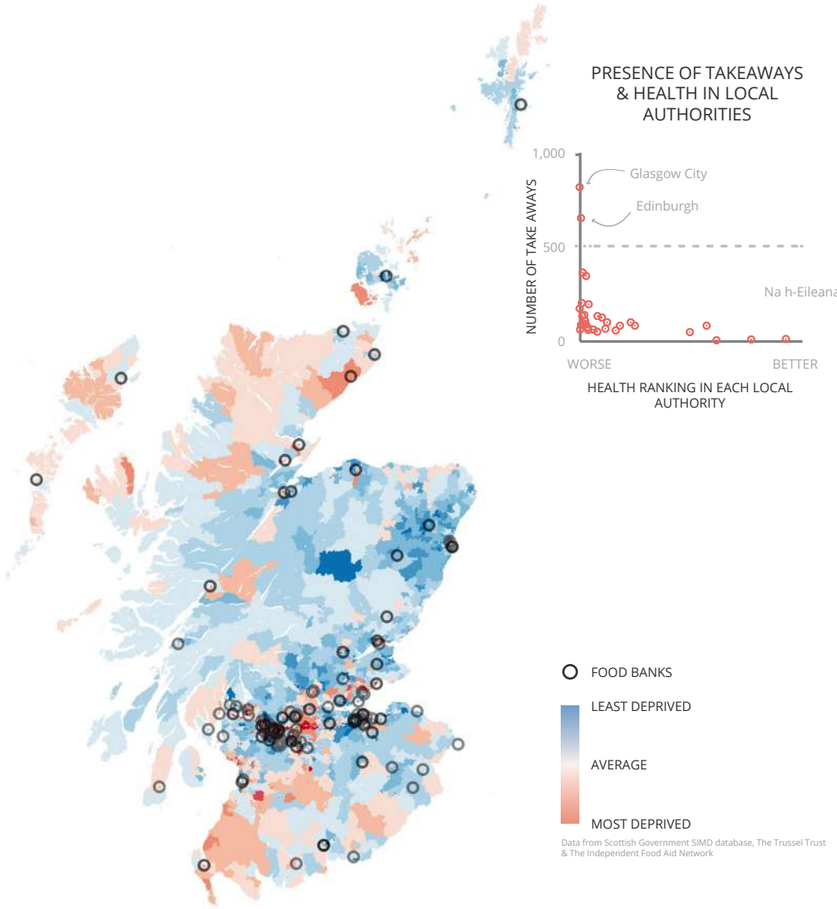
The cost of everyday essentials can be much higher in poorer and more rural areas. Citizen's Advice Bureau in Dumfries & Galloway found that the same basket of goods costed £8.96 in Langholm, but £24.05 in Dalbeattie. Some food items cost over three times as much, even within the same chain of supermarket.

STIRLING, A CASE IN POINT

A study of Stirling's food system has demonstrated that developing the local food economy can deliver health, environmental, social and employment benefits.

Using 10% of Stirling's arable land would be enough to produce enough fruit and vegetables for everyone in Stirling to eat their five a day. However, currently less than 1% of Stirling's arable land is used to grow vegetables, and there is just 1 greengrocer on Stirling's high streets.

SOCIO ECONOMIC STATUS & FOODBANKS IN SCOTLAND



Data from Scottish Government SIMD database, The Trussel Trust & The Independent Food Aid Network

PRESENCE OF TAKEAWAYS & HEALTH IN LOCAL AUTHORITIES

CHANGE IS COMING:

- In 2015, the Scottish Government protected the Scottish Welfare Fund in law, and provided local authorities with ring-fenced funding to provide Crisis Grants and Community Care Grants. The most common Crisis Grant expenditure in the last quarter of 2017 was on food, at 43%.
- In 2016-17, the Fair Food Transformation Fund supported 26 emergency food aid providers to embed the dignity principles in their practice, and transition away from charitable models of emergency food provision.
- In 2018, Scotland's newly published Diet and Healthy Weight Delivery Plan, commits to reviewing how to better control the relationship between the food environment and the planning system in the next iteration of Scottish Planning Policy.

OUR COMMUNITIES - 2030

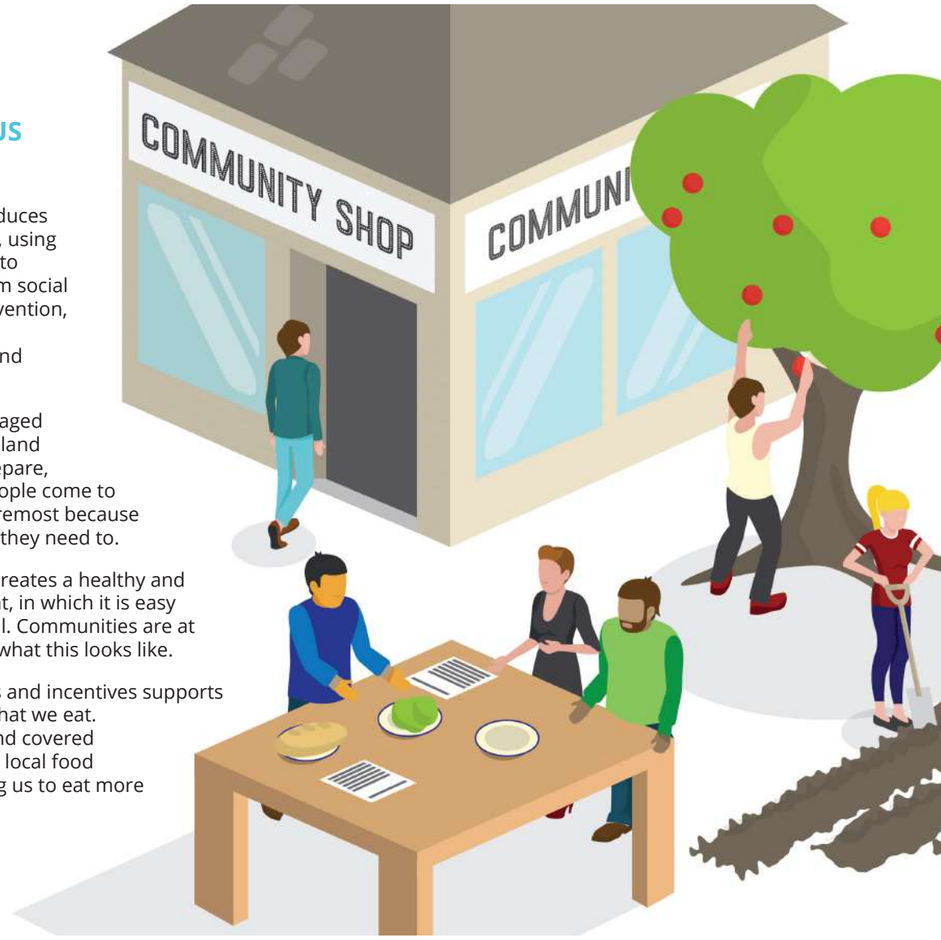
Food is about more than calories and exports. Food is about wellbeing, culture and empowerment. In 2030, the needs of people and communities sit at the heart of decisions shaping our food system.

Whilst communities are well placed to support each other, responsibility for ensuring everyone has enough money to eat well rests with government. Communities have access to spaces to share food and socialise.

All local authorities treat access to nutritious, fair and sustainable food as a strategic priority, and enable communities to be active participants in shaping their immediate food environment. Across Scotland as a whole, it is easy and rewarding to produce more of what we eat, and eat more of what we produce.

FOUR STEPS TO GET US HERE

1. Every local authority produces a cross-cutting food plan, using all the powers they have to progress food rights: from social security and poverty prevention, to health promotion, development planning, and procurement.
2. Communities are encouraged and supported to access land and facilities to grow, prepare, cook, and share food. People come to these spaces first and foremost because they want to rather than they need to.
3. Planning law and policy creates a healthy and diverse food environment, in which it is easy and affordable to eat well. Communities are at the forefront of shaping what this looks like.
4. Access to land, resources and incentives supports us to produce more of what we eat. Community food hubs and covered markets bring affordable local food closer to people, enabling us to eat more of what we produce.



CASE STUDY: BRIGHTON AND HOVE

By developing a Food Poverty Action Plan, Brighton and Hove have been able to baseline the state of food insecurity, agree actions to reverse the trend, and measure the impact. There has been 93% progress on the actions set, in the third year of the Plan.

Actions in the Plan go beyond responding to food poverty, and focus on tackling the structural causes. The Plan has resulted in action to maximise incomes and manage debt, as well increase access to fruit, vegetables, and opportunities to share meals and participate in community life.

Work was also undertaken to understand the equalities implications of food insecurity, including the impact on black and minority ethnic communities, young and older people, and disabled people.

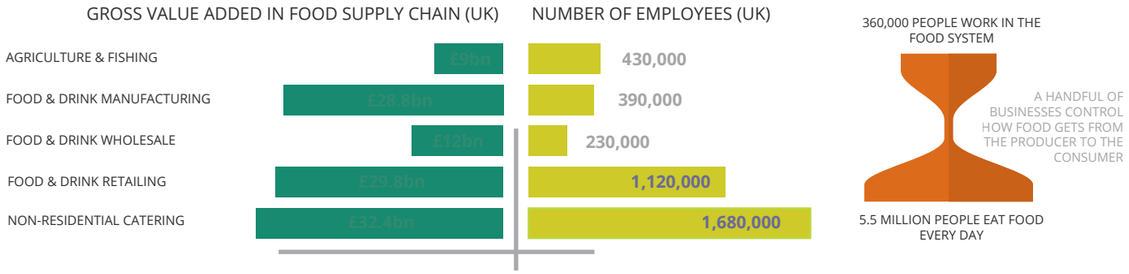
Recognising the complexity of addressing food challenges in isolation, Brighton and Hove have incorporated the Plan in to their broader 'Spade to Spoon' Strategy, joining-up action to deliver a healthy, sustainable and fair food system.

OUR LIVELIHOODS - 2018

Our food system plays a big role in Scotland's economy, creating both wealth and poverty. In rural areas, 1 in 12 people work in agriculture, while 1 in 10 of all Scottish jobs are estimated to be dependent on agricultural activity and primary produce. The agri-food sector is in constant growth; food and drink is the largest industry for international exports.

Yet, many of those who work to produce, harvest, process, sell, and serve food struggle to make ends meet. The success of the food and drink industry hides a human cost driven by supermarket competition, automation, and productivity drives. The public purse comes to the rescue with agricultural subsidies to keep farmers afloat and benefits to relieve in-work poverty.

ONLY A FRACTION OF THE MONEY WE SPEND ON FOOD GOES BACK TO PRODUCERS

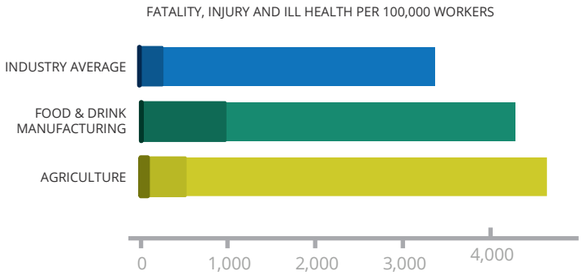


JOBS IN THE FOOD SECTOR ARE AMONGST THE MOST PRECARIOUS

48% of people working in the food sector in the UK are paid below the Living Wage.

MANY FOOD SECTOR WORKERS SUFFER FROM THEIR JOB

Agriculture and food manufacturing have higher work-related ill health and injury rates than average.



CHANGE IS COMING:

- Better Than Zero is a young trade union group fighting against zero-hour contracts and exploitation in the hospitality industry. They recently successfully pursued a legal case against last-minute shift cancellations and are setting up regional hubs to support workers join forces to improve practices locally.
- More and more cooperatives and social enterprises are being set up to offer a different model of food supply; Greencity Wholefoods, Equal Exchange, Locavore, New Leaf, and Dig In are only a few examples.
- Sales in 'ethical' food and drink (certified for animal welfare, sustainability, or workers' rights) rose steadily over the last two decades. In 2015 they accounted for almost 1/10th of all household spent on food. Public opinion and purchasing power is shifting supply chains practices.
- In Scotland, minimum rates of pay and other work conditions for agricultural workers continue to be set by the Scottish Agricultural Wages Board, which also covers migrant workers. Members of the Board include Unite to represent employees, and the National Farmers' Union Scotland and Scottish Land and Estates to represent employers.

OUR LIVELIHOODS - 2030

In 2030, fair employment practices across the economy and thriving local food economies are the foundations of decent livelihoods for the many people working to produce, prepare, and sell our food. Automation has replaced many low-skilled jobs, but this process was well managed, with investment in a just transition for the workers and communities who were dependent on those jobs in agriculture, manufacture, and other parts of the food system.

Working in the food and farming sector is rewarding: workers and producers are more specialised, enjoy good workplace environments, and are paid fair wages and prices. Our food system is grounded in a strong and diverse network of local food businesses where workers are skilled, creative, and connected. Community-supported agriculture, workers' cooperatives, and social enterprises are supplying a significant share of our food. No one is priced out of healthy and sustainable food anymore.

LOCAL FOOD CAN ACT AS A MULTIPLIER

FIVE STEPS TO GET US HERE

1. Being a living wage employer is a requirement for all public tenders.
2. Regulation tackles precarious employment practices and ensures all workers, including those on zero-hour contracts, enjoy their full rights.
3. The UK and devolved Governments enforce fair practices in supply chains.
4. Targeted support for the agri-food sector to make workplaces safer and better equipped, and to promote life-long professional development, including in health and safety.
5. The Scottish Government and Local Authorities develop a strategy to support 'local food economies' in which growers, communities, and local businesses work together to everyone's benefit.

CASE STUDY: NORWAY

Norway's agricultural sector is organised through cooperatives that are responsible for marketing, processing, negotiating prices, R&D, and lobbying on behalf of their members. Every agricultural sector has a national cooperative with members from across the country. In the dairy sector more than 90 per cent of the milk produced is delivered to the cooperative. For meat, eggs and grain it is 60-70 per cent, and for vegetables approximately 50 per cent.

Gartnerhallen, for example, is a fruit, vegetables, and potatoes cooperative owned by 1400 producers. In 1997 this cooperative started a long-term partnership with Bama Gruppen, Norway's largest fresh produce wholesalers, and NorgesGruppen, Norway's largest grocery chain. By working together, farmers are able to increase their negotiating power and secure better prices for their produce.

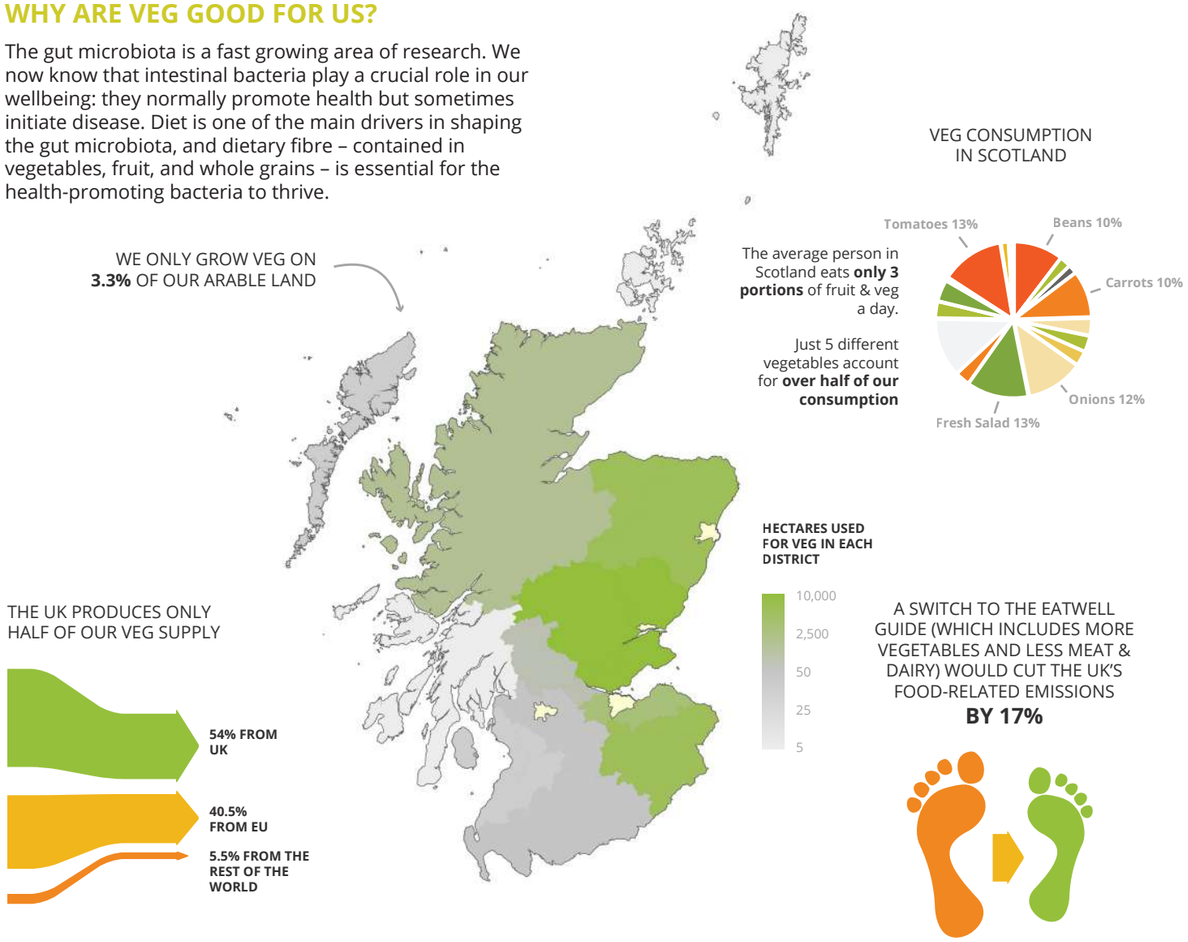
OUR VEG - 2018

In 2018 the story of our vegetables is one of inequalities and contradictions. While some turn to flexitarian or vegan diets, as a nation we consistently fail to meet the 5-a-day target. We produce plenty of vegetables very efficiently in Scotland and the price farmers get has fallen hugely in real terms over the last thirty years, and yet fresh veg is unaffordable or even unavailable to many. Supermarket shelves are packed with perfect vegetables all year round, but market gardens are a rare sight in Scotland.

Vegetables are not just a 'nice to have', they are the cornerstone of a healthy population, agriculture, and planet. They are an important source of dietary fibre and provide all the micronutrients our body needs to function well; they contribute to a healthy crop rotation in mixed farming systems; and they have a low environmental footprint, especially if grown without pesticides.

WHY ARE VEG GOOD FOR US?

The gut microbiota is a fast growing area of research. We now know that intestinal bacteria play a crucial role in our wellbeing: they normally promote health but sometimes initiate disease. Diet is one of the main drivers in shaping the gut microbiota, and dietary fibre – contained in vegetables, fruit, and whole grains – is essential for the health-promoting bacteria to thrive.



CHANGE IS COMING:

- The Peas Please initiative seeks to tackle supply-side barriers to veg consumption. The food industry is responding very positively, with many small and large retailers, food manufacturers, and caterers committing to take action to make it easier for people to eat vegetables.
- In June 2018, a Scottish Industry Leadership Group from the fruit, vegetable and potato sectors produced a strategy for growth by 2030. The document places an emphasis on the need to support profitable and resilient Scottish businesses, to boost consumption and displace imports whenever possible.
- The Scottish Government is investing in the Food for Life programme to increase the use of Scottish produce in schools, hospitals and other public sector organisations.
- The last decade has seen a resurgence of veg growing in our towns and cities. All over Scotland, people are reclaiming green spaces on street corners, in public parks or by office buildings to grow food together.

OUR VEG - 2030

In 2030 our relationship with vegetables is better than ever and we are feeling the benefits of it. We produce more veg, on farms as well as in private, community, and market gardens in our towns and cities. There has been a renaissance in Scotland's glasshouse industry using renewable energy for heat. We are eating a greater variety of veg, with new varieties bred for health, resilience and taste coming onto the market. Whether eating at home, at school, in the workplace, or out for a treat, our veg is tasty, affordable, and centre-piece on our plates.

This revival of veg is benefiting our food producers, for whom sales of vegetables provide an important revenue stream in diversified businesses; our communities, who are coming together to grow, cook, and eat vegetables; our wellbeing, as people on low-income are no longer priced out of eating enough veg and balanced diets support good health for all; and our environment, with the shift to more plant-based foods mitigating our dietary climate footprint.

CROP DIVERSITY IS CRITICAL FOR SUSTAINABILITY AND FOOD SECURITY

Scientific trials in Scotland have shown that wild varieties of some vegetables contain higher levels of phytochemicals than the veg in our shops. Phytochemicals are compounds that help plants fend off pests and provide flavour. Researchers are demonstrating that certain phytochemicals in fruits and vegetables can help prevent type 2 diabetes, cardiovascular disease and cancer.

Hardier, tastier, and healthier; the genetic diversity in our wild veg is an invaluable resource to breed vegetables fit for the future.

FIVE STEPS TO GET US HERE

1. A new farming support system boosts Scottish horticulture by promoting innovation and cooperation, while supporting vegetable growers at all scales.
2. Local Authorities make food growing in and around urban settings a priority and provide land and support for grow-your-own initiatives, whether in allotments, private gardens, community gardens, public spaces, or market gardens.
3. The public sector leads by example with local and seasonal vegetables front and centre in all public meals.
4. Food retailers and the hospitality industry commit to making it easier for everyone to eat more vegetables and drive change through reformulation, smart product placement in shops and on menus, and positive marketing.
5. Agronomic research prioritises the development of varieties that are highly nutritious and resilient in a changing climate.

CASE STUDY: THE NETHERLANDS

The Dutch horticulture industry is world-leading. The Netherlands export over £6bn worth of fruit and veg each year all over the world, they are the number 1 exporter of fresh vegetables worldwide. At the same time, they face challenges in maintaining consumption and competing in a global market.

In 2017, the Dutch Ministry for Agriculture and the Fruit and Veg Industry Body 'Fresh Produce Centre' therefore joined forced to create the 'Dutch Action Plan for Fruit and Vegetables'. This initiative brings together public bodies, the private sector, and voluntary organisations with the aim to boost consumption of fruit and vegetables.

OUR BREAD - 2018

The industrialisation and globalisation of our food system have transformed our diets – both the types of food we eat, and the food itself. Nowhere is this more pronounced than bread, with the soft sliced loaves that make toast and sandwiches today hardly recognisable as what was once a nutritious staple food.

The story of bread reveals multiple failings and unintended consequences of the industrial food system. Wheat production is energy - and emissions - intensive and damaging to biodiversity. Harvested grains are traded all over the world as commodities and milled in ways that remove much of the nutritional content. The resulting bread is both depleted in fibre and hard for some people to digest.

HIGH-YIELDING MONOCULTURES PRODUCE COMMODITY CROPS

There are 120,000 known varieties of wheat but we only grow a handful commercially in Scotland, choosing the highest yielding ones over those with highest nutritional qualities.

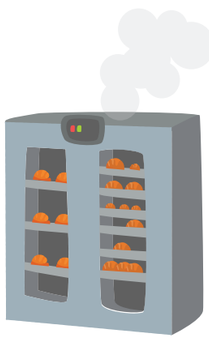
In Scotland, wheat is grown on **110,000ha**, almost **1/5** of the cropped land area, and **99% of crops** are sprayed with pesticides.

We produce up to **1 million tonne** of wheat per year, enough for Scotland's bread **six times over,** but almost all of Scotland's wheat is used for whisky, animal feed, and biscuits.

MODERN MILLING METHODS LOWER THE NUTRITIONAL QUALITY OF BREAD

The roller mill was invented in 1870. Significant nutritional losses in roller milled bleached flours were observed as soon as the 1920s; **vitamins A and B1** in particular were almost entirely lost.

Modern stone-grinding tends to overheat the flour, which can affect its nutritional quality, while roller mills waste about 25% of the grain, as they remove the germ, which contains the important **vitamin E**.



INDUSTRIAL PROCESSING IS FAR REMOVED FROM TRADITIONAL BREAD-MAKING

To give bread up to 7 days of shelf life, **industrial bakers add enzymes** which are not detailed on packets and whose 'cocktail' effects are unknown and unregulated.

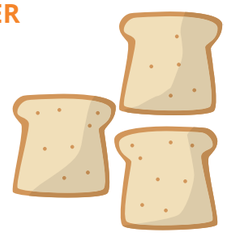
They also fortify bread with minerals to compensate for earlier losses. However, minerals artificially added are **less accessible to our body.**

A fast production process, using quick rise yeast, has been linked to difficulty digesting bread, linked to problems such as Irritable Bowel Syndrome.

BREAD NO LONGER NOURISHES US

Industrial bread no longer contains the complex carbohydrates, or dietary fibre, that are essential for healthy digestion.

Gluten sensitivity is estimated to affect **1 in 10** people in the UK, with **1 in 100** people suffering from coeliac disease.



Bread is the top most needlessly wasted food: in the UK, approximately **24 million slices** are binned each day, **44% of all bread** produced is thrown away

CHANGE IS COMING:

- A new Community Benefit Society known as Scotland the Bread is developing a new Scottish bread supply chain. Following trials of different historic wheat varieties, it is now growing at commercial scale and selling highly nutritious heritage flour. Scotland the Bread also trains community bakers, and is building a network for real bread in Scotland. People can now eat delicious bread with organic, nutritious wheat grown locally.
- High Rise Bakers are based in a tower block in Gorbals; they are bringing high quality bread to the local community, celebrating diverse food traditions and providing a space for refugees, migrants and long-time Scots to come together and learn new skills.

OUR BREAD - 2030

The bread supply chain looks very different. Bread is the cornerstone of healthy diets. Delicious, sourdough bread is the norm – served in schools, hospitals, and prisons, as well as easily accessible on the high street. Many more people are involved in growing, baking, and eating, with bread bringing communities together.

Using just a fraction of our arable land, we grow nutrient-dense wheat varieties that are resilient to our climate, with agroecological methods that support wildlife and healthy soils. The grain can be milled locally in community-run and commercial mills scattered across the country, to produce high quality, flavoursome flour. A thousand people have trained or retrained as skilled bakers and every community has a local bakery. Everyone in Scotland has access to fresh, nutritious, and delicious bread.

Sourdough

[mass noun] /sɑʊədəʊ/ Leaven for making bread, consisting of fermenting dough, originally that left over from a previous baking.

Yeasts and bacteria are found on the surface of cereal grains, such as wheat. When wheat flour is mixed with water and left to rest in a warm place, these microorganisms are activated: they multiply and slowly ferment the mixture, turning flour glucose into lactic acid and making micronutrients more readily accessible for human digestion.

FIVE STEPS TO GET US HERE

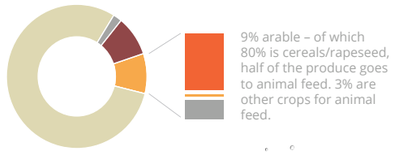
1. New legislation gives a legal definition to sourdough and wholemeal and regulates to prevent misinformation. It also requires all additives and 'processing aids' to be listed on the packaging.
2. A new national minimum nutritional content for bread flour is established with the intention of progressive improvement. This incentivises plant breeders, farmers, millers and bakers to find and keep more goodness in the grain from soil to slice.
3. A new generation of bakers is trained through apprenticeship schemes and community baking courses, and community bakeries provide worthwhile jobs that bring real bread within walking distance for every citizen.
4. Agricultural subsidies foster a shift to wheat produced with agroecological methods for human nutrition. Public money no longer supports monocultures of commodity crops destined for feed or booze.
5. Researchers investigate the relationship between our gut health and the food we eat, and the influence this has on overall health.

OUR LIVESTOCK - 2018

The place of livestock production and consumption in sustainable food systems, in Scotland and globally, is a highly contested issue. In Scotland, livestock farming is an important part of our economy and culture – and for good reasons: our landscape and climate are particularly suited to growing grass for ruminant livestock.

However, the way we farm livestock is hardly sustainable, with the sector receiving the lion's share of agricultural subsidies and accounting for around 15% of our total greenhouse gas emissions. There are also public concerns about animal welfare in intensive farming, especially dairy, pigs and poultry. Despite recent improvements, almost 100,000 bull calves are shot near birth in the UK each year as there is no money in keeping them. While Scotland has high standards, public expectations are increasingly pushing for positive animal welfare, not just the absence of harm.

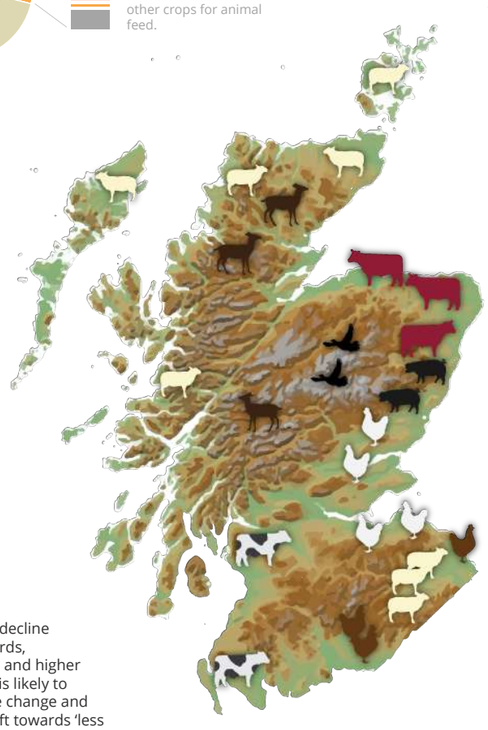
RUMINANT LIVESTOCK, DEER AND GROUSE DOMINATE SCOTLAND'S LAND USE.



Of the 6.3m hectares of agricultural land in Scotland 80% is grass and rough grazing.

9% arable – of which 80% is cereals/rapeseed, half of the produce goes to animal feed. 3% are other crops for animal feed.

We rely on large areas of fertile land to grow feed, both here and abroad. Bought-in animal feed accounts for around 40% of the variable costs of beef and sheep farms and over 60% of dairy farms.

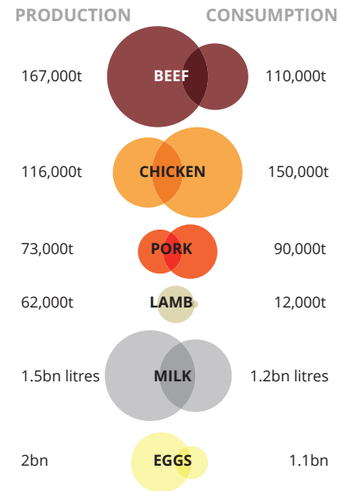


- RED DEER
- DAIRY COWS
- BEEF CATTLE
- LAYING HENS
- MEAT CHICKEN
- PIGS
- RED GROUSE
- SHEEP

There has been a long-term decline in sheep flocks and cattle herds, despite continuing subsidies and higher farm-gate prices. This trend is likely to carry on as action on climate change and changing diets catalyse a shift towards 'less but better' meat.

OUR DIET IS DISCONNECTED FROM WHAT WE PRODUCE

We produce more beef and much more lamb than we eat, enough milk and eggs but not enough pork or chicken to meet demand.



These figures are approximations, compiled from ERSA, QMS, and DEFRA data, for illustrative purposes.

CHANGE IS COMING:

- One in five of under 25s in the UK report not eating meat, with concern for the environment the top reason for 29%, and animal welfare for 22%.
- In the UK, McDonald's is committed to only using eggs from free range systems with a minimum of 20% tree cover for their breakfast menu.
- New Zealand's dairy farmers have agreed to a Government proposal to reduce emissions of carbon dioxide and nitrous oxide to net zero by 2050, with a cap on methane emissions.
- The Scottish Government set up a Deer Working Group and a Grouse Moor Management Group in 2017 to review current practice in deer and grouse management and make recommendations for how regulation can safeguard public interests and promote sustainability.
- UK Sales of antibiotics for use in food-producing animals dropped by 27%, from 62 mg/kg in 2014 to 45mg/kg in 2016 , surpassing a government target of 50 mg/kg set following recommendations in the 2016 O'Neill Review on Antimicrobial Resistance.

OUR LIVESTOCK - 2030

There are less sheep and deer, and more trees in the uplands and on the hills. However, a combination of improved farm support, land management contracts and farm diversification has brought more money and jobs to rural communities.

More farmers are working with dual purpose dairy cattle and hens. All pigs and chiclens have access to pasture, and there is more integration of pasture and trees. Scotland imports less soya; and relies more on grass, clover and home grown legumes for livestock feed. The organic livestock sector has grown to meet increased domestic demand as well as exports.

Scotland can produce a diverse range of high quality meat, as well as dairy, and eggs. Animals have a place in our agricultural system: they produce human-edible protein from human-inedible grass, trees, or food waste, for example.

FIVE STEPS TO GET US THERE

1. Government and industry provide leadership to reduce greenhouse gas emissions from livestock production, reflected in the new farm support system.
2. The Scottish Parliament places a new legal duty is on all those responsible for livestock to promote positive animal welfare.
3. The Scottish Government accelerates support for agroforestry and for organic livestock production, both for the domestic and export markets.
4. Farmers are incentivised and supported to redesign livestock farming systems to make them more animal-centred (as in the case study below).
5. Livestock producers are required to join benchmarking and quality schemes as a condition to receive agricultural subsidies, in order to raise husbandry standards and improve the efficiency of the 'long tail' of poor performers.

CASE STUDY: THE ETHICAL DAIRY

At Rainton Farm in Galloway, David and Wilma Finlay have pioneered a radically different approach to dairy farming. Since October 2016 their calves have stayed with their mothers for 5 to 6 months. The cows are still milked, but only once a day. While The Ethical Dairy project is still at an early stage, this new approach to dairy farming has already seen huge benefits as well as healthier, happier cows. Compared to an average dairy farm, The Ethical Dairy has:

- Cut greenhouse gas emissions by over 50%;
- Reduced energy use by over 50%;
- Cut antibiotic use by 90%;
- Cut agro-chemical use by 90%;
- Doubled the productive life of cows;
- Increased farm biodiversity five-fold;
- Increased the net amount of food produced by 80%;
- Exceeded the highest standards of animal welfare.

OUR WASTE - 2018

Globally, and in Scotland, about a third of the food produced for people never gets eaten by people. In the face of population growth and climate change increasing pressure on the resources needed to grow food, the moral duty to cut down on food waste is overwhelming.

It takes a land mass larger than China and 25% of all fresh water consumption globally to grow the food each year that is ultimately never eaten. Furthermore, when food waste goes to landfill it decomposes without access to oxygen and emits methane and ammonia, gases that contribute to climate change and air pollution.

THE MOST EFFECTIVE STRATEGY TO TACKLE FOOD WASTE IS TO REDUCE IT

REDUCE

Preventing 1 tonne of food waste leads to 4.02t CO_2e avoided, 8 times more than if it is recycled in anaerobic digestion.

REUSE

In the UK just over 40,000 tonnes of edible food surplus was redistributed in 2017, only 0.4% of total food waste. Just over half came from manufacturers, the rest from retailers.

RECYCLE

56% of Scots report separating their food waste from general waste, against 26% in 2012. Most recycled food waste goes to anaerobic digestion.

The share of food waste being collected and processed separately by local authorities is growing, but still less than a 1/5 of total estimated household food waste.

Food packaging also generates waste – around 0.5M tonnes in Scotland, and an estimated 2/3 of the packaging sent for recycling is difficult or impossible to recycle.

The reasons for household food waste are complex, with people trying to do the right thing while under pressure to buy more, eat healthily, make sure food is safe, and nourish their children.

FOOD WASTE IS COSTLY

- In 2014, Scottish households spent £1.1 billion on food they could have eaten.
- Growing, processing, distributing and disposing of that avoidable food waste accounted for about 1.5tMt CO_2eq, about 3% of Scotland's total carbon footprint.
- Waste food which is landfilled rather than recycled generates methane as it decomposes.

CHANGE IS COMING:

- UN Sustainable Development Goal 12.3 calls for halving food waste and reducing food losses worldwide by 2030.
- The Scottish Government has a target "to reduce all food waste arising in Scotland by 33% by 2025 and work with industry to reduce on farm losses of edible produce". They also banned biodegradable material going to landfill from 2021, and are planning to introduce a deposit return scheme for drink containers.
- Retailers are taking action. Tesco for example has a commitment to the SDG goal of halving food waste by 2030, and is implementing initiatives such as whole crop purchasing, a food waste hotline for suppliers, redistribution, and removing best before labels.
- Feedback's Gleaning Network UK works with farmers to prevent the on-farm waste of food, organising volunteer gleaning days and connecting farmers who have gluts of produce with secondary markets.
- There are many experiments in social innovation to tackle food waste: community fridges where local residents can leave and pick up surplus food; groups like FoodSharing Scotland and the Real Junk Food Project who redistribute, and sometimes cook, surplus food from small retailers and caterers; gleaning groups who harvest surplus crops from farms; and food pantries who sell surplus food at low prices.

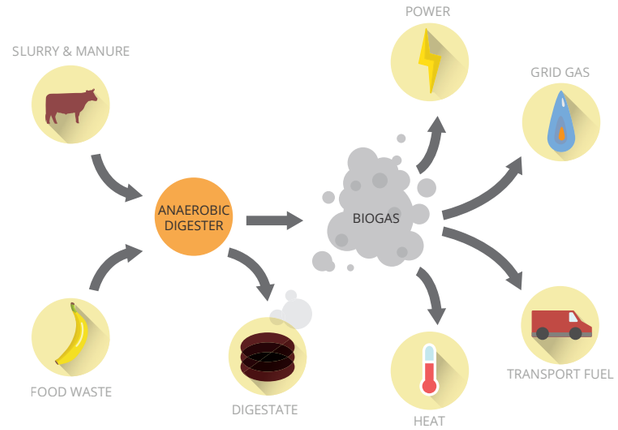
OUR WASTE - 2030

We hit the 2030 target of reducing food waste by 50% across the piece, and there's almost none of it ending up in landfill. Food and drink packaging is mostly in the deposit return scheme, and most of the rest is getting composted.

There has been quite a change in cultural norms. We're buying food little and often and there are no incentives to bulk-buy, while portion sizes have shrunk back so there is less plate waste. Most of us have got a bit more organised about avoiding waste at home.

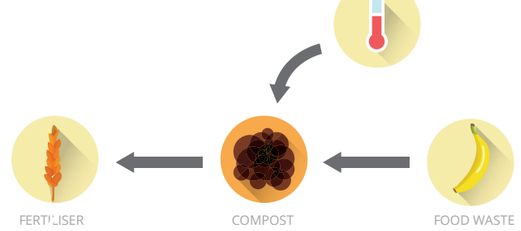
Manufacturing businesses have redesigned processes to minimise waste, both to save money and to respond to increasing expectations from retailers.

ANAEROBIC DIGESTION & COMPOSTING ARE THE TWO MAIN WAYS TO RECYCLE FOOD



In anaerobic digestion, food waste is put into a sealed container with anaerobic bacteria. The bacteria produce methane (natural gas) as they process the waste, which is captured for use, for heating or to generate electricity. The residual material (digestate) can be used as a fertiliser. This process can use a mix of food waste and animal manure.

In composting, food waste is kept aerated, with aerobic bacteria decomposing the biodegradable materials, which heats up the material and kills pathogens, leaving behind a versatile fertiliser and soil improver. Composting can be done cheaply and on a smaller scale, so may be more suitable in remote rural areas.



FIVE STEPS TO GET US HERE

1. Retailers, caterers, hospitals, schools, manufacturers, local authorities all report their food waste figures on a national portal, providing transparency and showing progress. Retailers commit to reducing waste across their supply chains, not just in store.
2. Place-based, community led programmes work to change social norms, influence retailers and create practical local solutions for reducing and recycling food waste.
3. Manufacturing and agricultural processes are redesigned on circular economy principles, seeing everything from broccoli stalks to lobster shells as a resource.
4. A safe system is put in place so farmers can feed treated food waste to pigs.
5. Dignified secondary markets find a home for all food at the end of the day in ways which promote choice, control and contribution.

CASE STUDY: JAPAN

Japan safely collects, blends and heat treats surplus food for use as 'eco-feed' for pigs at half the cost of conventional food, and people are prepared to pay a better price for this pork. As of 2015, Japan and South Korea respectively recycled 35.9% and 42.5% of their food waste as animal feed.

In Chiba, Japan, food waste from households and businesses is digested and the biogas is supplied to the neighbouring JFE Steel plant where the biogas is used to generate electricity and steam for the plant.

All products made using eco-feed products are certified and carry the eco-feed logo.

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DESIGN

2018