



Developing more sustainable food and farming based on organic and agroecological principles

What we do

Why we do it

What we've achieved

The Organic Research Centre (ORC) is the UK's leading independent research centre for the development of organic/agroecological food production and land management solutions to key global issues including climate change, soil and biodiversity conservation, and food security. Established in 1980 by David Astor, the Progressive Farming Trust Ltd., ORC's parent educational charity, has continued to pursue the visionary sustainability goals of its founders.

Why organic?

Organic farming and similar agroecological approaches work with natural ecosystems and biological processes to produce high quality food, maintain and encourage genetic diversity of farms and their surroundings, and encourage fair rewards for farmers and others participating in the food system. Organic farmers capture solar energy to build soil life and soil fertility through biological nitrogen and carbon fixation. They use crop rotations and diversity to encourage natural weed, pest and disease control. Animals are kept free-range with access to pasture for foraging, which allows them to express their natural behaviours, and greater use of pastures ensures that they complement, rather than compete with, human food needs. Manures and crop residues are recycled to help close nutrient cycles, minimising waste and conserving non-renewable resources.

Organic farms are less reliant on external inputs, such as synthetic nitrogen fertilisers, fossil energy and pesticides. The result is food production that is less resource consuming, more diverse and more resilient, and therefore better equipped to cope with uncertainty at multiple levels. While individually all these practices can be used by any farmer, a key feature of organic/agro-ecological land management is combining them in a system-driven approach that can make food production and land management more sustainable and generates greater health and wellbeing of society and the individual as well as the environment.

Building resilience and conserving wildlife through diversity

Scientific studies have demonstrated that organic farming can enhance the diversity of species, both cultivated and wild, with benefits for soil organisms and invertebrates, pollinators, plants, birds and other animals. Restricted pesticide inputs, more diverse crop rotations and the greater number of species grown all contribute to greater diversity and to natural weed, pest and disease control.

- ✓ At ORC, we have successfully **pioneered** the concept of **'population' breeding** in wheat and other arable crops, where each individual plant in a crop is bred to be genetically distinct from every other one, making the whole crop more resilient to changes in weather conditions and pest and disease pressures. This is the antithesis of single variety breeding with its emphasis on genetic uniformity.
- ✓ We have secured a **temporary marketing experiment** under the relevant EU seed marketing regulations to enable trade in seed from the populations from 2014.
- ✓ We are **developing** a diverse range of **agroforestry** systems. Integrating trees into farming systems increases productivity and biodiversity, conserves water and has positive impacts on soil fertility and pest and disease incidence.
- ✓ We are developing complex seed mixtures with a wide variety of **legumes** and **other cover crops** that **encourage pollinators** and build soil fertility, fix nitrogen from the air, provide forage and improve animal health.



Protecting and improving our soils

The return of carbon-rich crop residues, green manures and fertility-building phases in organic crop rotations help to conserve and enhance organic matter levels in soils, soil structure and soil biological activity. Organic management also improves soil water infiltration and retention, reducing surface run-off, the risk of soil erosion and flooding, and the loss of nutrients to water courses.

- ✓ We are developing **reduced tillage** options which, in combination with the use of **living mulches** and **cover crops**, contribute to reduce energy consumption and enhanced soil protection. Our work on agroforestry and legume mixtures also contributes to improving soils on organic farms.
- ✓ We are **helping farmers to be more efficient** by developing rotations and practices that reduce nutrient losses, e.g. from nitrogen leaching, and improve the recycling of nutrients, for example through leaf litter from agroforestry systems and through improved composting and manure management.



Conserving non-renewable resources and developing renewable alternatives

By reducing external input use, the consumption of non-renewable resources such as fossil energy and minerals is reduced and the use of renewable energy sources is encouraged. Organic farms emphasise nitrogen self-sufficiency through biological fixation and the recycling of other nutrients. By avoiding most pesticides and synthetic nitrogen, the fossil energy required to produce these inputs is substantially reduced. Organic practices also enhance the conservation of soil and water resources and reduce the risk of pollution.

- ✓ We have pioneered concepts for **urban green waste composting** in the UK to encourage the recycling of key nutrients such as phosphorus and potassium back into agriculture.
- ✓ We have developed tools that allow farmers to **budget and benchmark their energy and nutrient use**.
- ✓ We are leading on work to make better **use of hedgerows** and other landscape elements as a **productive renewable energy resource** while conserving biodiversity. This has the potential to enable rural communities to access local wood fuel as a substitute for oil through individual or district heating schemes.

Climate-smart agriculture

Greenhouse gas emissions associated with most organic systems are reduced, compared with similar non-organic systems, because they use less fossil energy-based inputs (such as nitrogen fertilisers and pesticides) and because organic crop rotations help restore soil carbon in soil organic matter.

- ✓ We are investigating the **impact of a widespread adoption of organic farming** on the UK's greenhouse gas emissions.
- ✓ We are **developing low-carbon farming tools and guidelines**, for example improving nutrient management, soil and grassland management, livestock management and the use of renewable energy.
- ✓ We are working with government to ensure they have **robust data and information on farm greenhouse gas emissions** through active participation in the UK Greenhouse Gas Platform.



Promoting animal health and welfare

On organic farms animals of all species are kept free-range, with regular outdoor access to areas with green vegetation for most of their life. High quality housing and reduced stocking rates also support animal welfare. Prophylactic use of medication is discouraged and organic producers seek to enhance health and minimise disease incidence through good husbandry and grazing management practices.

- ✓ We are working to develop **better use of pasture** and other **locally grown feed sources** so that reliance on imported protein feeds such as soya can be reduced. The work also contributes to improving biodiversity and improving sustainability of livestock systems and reduces the risk of GM contamination.
- ✓ We are investigating the **impacts of pasture diversity and ecology on nutrition, disease and parasite incidence**, and on overall animal health as a consequence of improved immune responses and pathogen/parasite suppression.
- ✓ We are working with a group of dairy farmers to **reduce their antibiotic use**.

Food security, productivity and public health

The interactions of soil, plant, animal, humans and the planet through 'health' is a key principle of the organic agriculture movement. Human health is seen to be dependent on a healthy soil, healthy plants and healthy farm animals. This includes the provision of safe, nutritious, high quality food in sufficient quantities.

- ✓ We have developed the concept of **net system output** as a measure of overall farming system productivity and its ability to meet human needs for food. This takes account of diversity of outputs produced including the use of crops as feed for livestock and avoids an over-simplified focus on individual crop yields as a measure of productivity.
- ✓ We are encouraging communication and collaboration between different scientific disciplines with respect to **health concepts** at different levels, and we are working to translate such concepts into practical guidance for farmers.



Sustainable livelihoods

All farmers need to earn a living. Despite not using yield-enhancing inputs, most organic producers achieve similar incomes to comparable non-organic farms. Many consumers are willing to pay a premium for products with legally-backed certification of organic authenticity. To make good organic food available to all, many organic producers have developed innovative marketing and processing initiatives and close links with consumers in new business models such as community supported agriculture.

- ✓ We **analyse financial and business information** and publish reports for different farm types and enterprises, e.g. the Organic Farm Management Handbook. We are seeking to extend this work to address the needs of **smallholders**.
- ✓ We are working to improve the **transparency of the organic market** for producers, food businesses, consumers and policy-makers, by analysing and publishing data on consumer behaviour and markets to enable businesses to make sound decisions.
- ✓ We **engage with policy-makers** to ensure that support schemes and regulations are fair and recognise what organic farmers deliver.

Supporting farmer innovation

Farmers have always been at the forefront of agricultural innovation and are familiar with finding new solutions to cope with changing market, climatic and political conditions. Whereas other farms rely on external inputs, organic farmers have to be innovative in finding solutions to solving production problems.

- ✓ We work with farmers to enable them to become confident innovators. Our **participatory approach** emphasises producer involvement and leadership through the whole research and development process.
- ✓ We have developed an on-farm **sustainability assessment and advisory tool** that provides rapid information on the delivery of public benefits by farmers.
- ✓ We support the **training and accreditation of organic advisers** through the Institute of Organic Training and Advice (IOTA).
- ✓ We provide **publications, conferences, training and information resources**, including the new information hub www.ecofarminginfo.org.



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