



# Ecological Solutions

to ecological problems

# Ecological Solutions to Ecological Problems

**W**hen I was growing up, the subject of ecology was still very new. I remember reading books about animal behaviour in which the authors de-bunked ideas established in Victorian times, which were based upon studies of animals in London Zoo. Ecologists discovered that animals in the wild behave very differently from animals in captivity, and that the interrelationships between different living things - and between living and non-living things - was much more complex than had been previously realised.

At the same time, information was starting to build up about human impact on the environment. Previously, it had more or less been assumed that if people (usually meaning people in Europe or America) came up with a new technology, or new way of doing things, then that must be good - particularly if it made money. However, evidence started to appear about rivers being polluted by chemical waste, nitrate and phosphate run off from agricultural land affecting water quality, DDT and other pesticides persisting in food chains, acid rain harming trees, deteriorating air quality in cities, etc. Like many young people today, I was drawn to all this information, and found it hard to square it with the official school curriculum, which painstakingly described history as a steady progress from the stone age and superstition to the industrial age, and reason; and in which the teaching of science focussed on the development of machines and the breaking down of the natural world into its smallest molecular components, rather than trying to understand the working of nature as a whole. Even the biology lessons involved cutting things up, and almost no time was spent on trying to understand complex systems.

Fifty years later, I can see that this dichotomy has become so acute, that it is putting everything in danger: the environment, and ecology, are pushing themselves into the news agenda with greater force on an almost daily basis - global warming, forest fires, drought, mass extinction, micro-plastics, etc. - but the solutions that we, as a society, are coming up with still come from the old way of thinking, and are only making things worse.

Electric cars, wind turbines, cobalt and lithium mines, solar panels, and nuclear power plants may be dubbed as being 'green' technologies, but they do not fit into the natural ecosystem, nor do they provide habitats for plants or animals; they are simply the next step in a process of development that is inherently detached from natural processes. What we need to find are ecological solutions to our ecological problems.

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## Mulch

One of the environmental problems looming on the horizon, but not yet fully acknowledged, is the exhaustion of soil fertility on agricultural land. Several centuries of increased mechanisation and poor soil management has led to a steady decline in the amount of organic matter in agricultural soils. Without organic matter, soil micro-organisms cannot exist, and, as a result, they have slowly disappeared, without anyone really noticing until recently. Without

the micro-organisms, there was nothing for the worms and insects living in the soil to eat, and without the worms and insects, birds, reptiles and small mammals could no longer survive. The consequences are multi-faceted: the depletion of their bacterial populations means that agricultural soils can no longer absorb nitrogen from the atmosphere, crop plants suffer from not being able to exchange nutrients with soil fungus, and without birds and animals to control them, pest populations can explode exponentially. It became apparent over a hundred years ago, that there was a problem, but, unfortunately it was masked by the development of nitrogen fertiliser. As a result, the process of soil impoverishment has been carried much further than would otherwise have been possible. A hint of the seriousness of the situation was provided last year, when cereal farmers said that their yield would fall by fifty percent (probably an underestimate) if they could not get their fertiliser as a result of the war in Ukraine.

There is a simple, carbon-neutral, environmentally-friendly long-term solution, that can be put into practice by anyone with a garden - mulch. Rather than mowing and strimming, vegetation can be allowed to get to a reasonable size, and then cut with a scythe or a sickle. It can then either be left to dry in the sun, and then stacked up for later use, or applied directly as a mulch.

Areas can be covered in mulch between crops, rather than leaving the surface exposed, and fallow areas can be covered in several layers of mulch, to stifle weeds. When it comes time to sow the next crop, the mulch can be wheeled off to one side of the patch, where it will continue to decompose, and provide a home for lizards, slow worms, toads, grass snakes, etc., before being re-applied to the earth at a later date.

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Initially, the process of decomposition might be slow, due to the lack of life in the soil, and in the garden in general, particularly if you are working on reclaimed agricultural land; but by creating a cycle of cutting and mulching within the garden, a unique ecosystem starts to re-create itself, composed of a complex mix of organisms specifically suited to the local conditions. In time, things will speed up, and the mulch will start to break down more quickly, and will be absorbed into the soil. If you only work the soil to a shallow depth, organic material will start to accumulate near the surface, attracting worms and insects, which will themselves work the soil to a greater depth, counteracting the effect of soil compaction, improving drainage, and helping the soil to heat up in the spring.

The long-term effect of mechanised farming, and working the land with machines, has been to destroy the top soil. It has been possible to find short-term non-ecological solutions to the problems that this has caused, but each of these solutions has caused further problems - dependence on fossil fuels in agriculture, soil compaction and the need for bigger and bigger machines, plagues of pests being treated with pesticides, the emergence of super weeds, monocultures lacking nutritional value, etc.

The ecological solution of re-building the top soil by re-cycling mulch in the garden, might seem like a slow and painstaking remedy, but, because it involves working with nature, instead of against it, it comes with many unexpected compensations: bird song, fresh air, good food, and perhaps even a gardening community. If we sought ecological solutions for our other environmental problems, they too might come with hidden benefits.

*Gareth Lewis*