SOIL HEALTH MEANS RESILIENCE

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When I took the reins of my family's farm as a third-generation farmer, soil was traditionally given little consideration. It was something you had – not something that needed nurturing. It was 'dirt' after all – solid and reliable beneath our feet. But despite soil's ubiquitous presence around the world, soil health is sadly often at its worst. In England and Wales, over 2 million hectares of soil are at risk of erosion and 4 million hectares at risk of compaction. Intensive farming has caused arable soils to lose 40-60% of their organic carbon through relentless tilling and disturbance from vehicles. In recent decades, farming's collective awareness of soil's value was diminished by a singular focus on the labour above ground. But now, with increasing climatic pressures, soil health is critical.

As a farmer who relies on the soil to grow nutritious food, healthy soil is my number one asset. If I improve the soil's quality, then my farm business can be more profitable and viable in the long-term. Only healthy soil can sustain thriving biodiversity, and that consequently, sustains food production which directly delivers financial return.

I distinctly remember the turning point when I realised the impact our farm's practices were having on the soil. It was nearly a decade ago and we were using heavy cultivation to prepare the soil for crops. We were in the middle of ploughing when I noticed a tyre print from two years before in the bottom layer of soil. It was so heavily compacted from the weight of the tractor that the tyre print was sealed into the clay, ready to be revealed when we lifted the furrow once again. This was the beginning of a fundamental shift in my awareness of how our approaches were putting strain on the environment with lasting impacts. It quickly became my focus to develop practices that tread lightly on the soil, at the same time as restoring the ground's natural biodiversity.

At Papley Grove Farm, we have transitioned to soil management that is regenerative. What is key to restoring our soils to a healthy, fertile condition is being able to read and assess it, to understand the properties and indicators for my soil type, including measuring how successful our regeneration techniques are. Through a 'less is better' approach, we have moved from a plough-based system to using a machine that moves the soil to a depth that doesn't disrupt its biology, release carbon or cause compaction. Our machinery uses floatation tyres and track systems to distribute weight so we cause less harm. We grow a variety of cover crops selected for their benefits to soil health: buckwheat, phacelia, vetch, linseed, among others, all draw nutrients into the soil and enrich the organic

content of the Earth. We select different seed mixes according to area, so the more compacted and unhealthy zones are targeted with plants that will regenerate with the right desired outcome. This low soil disturbance has led to increased insect life in the fields, meaning that predators can manage our pest problems so we can reduce our input costs through the avoidance of insecticides. Another benefit of our cover crops and no-ploughing approach is in our topsoil. This was once routinely ploughed to the bottom of the farrow causing unnecessary disruption to natural processes, but it is now maintained without disturbance and the benefits to worm life are numerous.

Why should a farmer be concerned about earthworms? Worms, in many ways, are a crucial form of livestock for every farm, regardless of the system, as they fertilise the Earth by breaking down decaying matter, in turn providing nutrient-rich soil that will grow nutritious crops or feed livestock. Worms also improve the soil structure by loosening the composition and oxygenating the soil, leaving space for water to be drained from the surface.

But why is this necessary? In the context of climate mitigation and reducing threat from global warming, soil is the answer. Research has found that soil without earthworm activity can be 90% less effective at draining water, which has a devastating knock-on effect for flood mitigation.

Soil is the largest store of carbon on Earth and we must do everything to protect and restore it if we have any chance of meeting ambitious net-zero targets. These actions will not only benefit the climate, but our business too. Our weather is becoming increasingly volatile as a result of the climate emergency, but the soil beneath our feet is key to building resilience in the midst of unpredictability. During times of drought, the regenerative practices we have adopted enable my crops to survive through their ability to hold on to water. In times of heavy rainfall, the opposite is true with a stable soil structure that can withstand flooding through faster drainage.

Ultimately, soil health equates to resilience. As we move towards a new era of public money for public goods in the UK, action to restore soil health will be vital as an underpinning asset of any successful farm business. But getting there takes time. Government must provide a clear roadmap and establish soil security as determining the health of our future and securing the foundations upon which all farming and food production depends. The answer to so many of our challenges lies right beneath our feet.