SO JUST WHAT IS BIODIVERSITY?

If there was a buzzword of the year in 2018, it was probably sustainability, but as we near another year end, *Stuart Meikle* asks should that accolade for 2019 now go to biodiversity?

As farmers, do we really understand what biodiversity is? If not, farmers can be forgiven because even amongst the broader, learned community, confusion clearly abounds. It is time for clarity.

A farmer's interpretation of 'biodiversity'

One has not directly asked 100 or 1,000 farmers, the question 'what do you think biodiversity is?' Maybe one should. Although a rapidly rising awareness of soil health and regenerative agriculture will be changing the answer fast, many would have said that biodiversity was the birds, butterflies and bees and small mammals that existed around the margins of their farming operations.

After half-a-century or more of scientific, chemistry-first, agriculture we have generations of farmers who even see the presence of biodiversity on their land as in conflict with their farm's food producing and income-generating potential. Biodiversity is a part of nature and should be controlled, nay even eliminated, from those land areas dedicated to farming. To entertain 'biodiversity' on one's farm is to accept a trade-off; you have production, or you have biodiversity. To be fair, such an interpretation is not entirely the farmer's fault, it has evolved that way.

For decades now conservation and conservationists have also focused upon the margins. It was and is a de facto acceptance that farmland was for farming and the leftovers were for nature. It was sustainable intensification long before those words were ever coined. Among the conservation community, that acceptance and accompanying mindset largely remains. Hence, it is understandable if many of our current farmers have come to think likewise.

'Biodiversity' must be of far deeper concern

The widespread collapse in biodiversity is now making headlines. They may, for example, be about the loss of Ireland's farmland birds, which is catastrophic for some species. Or they may be couched in terms of their impact on our food security as per the fall in vital pollinator species numbers.

Occasionally we may read reference to the decline of subterranean dwellers like the earthworm, but rarely do we see biodiversity loss written about in the context of the billions of creatures that live within our soils. But, it is in the soil that we should be looking for answers as to why there is visible-biodiversity loss. Almost certainly, biodiversity collapse is due to food-chain collapse. It may happen by events [as per pesticide applications] causing the removal of links, but it may also be due to the loss of the very foundations of those food chains; albeit they may be invisible to the naked eye.

THE NUMBERS

93%

Population drop of the insect-eating Spotted Flycather bird since 1967

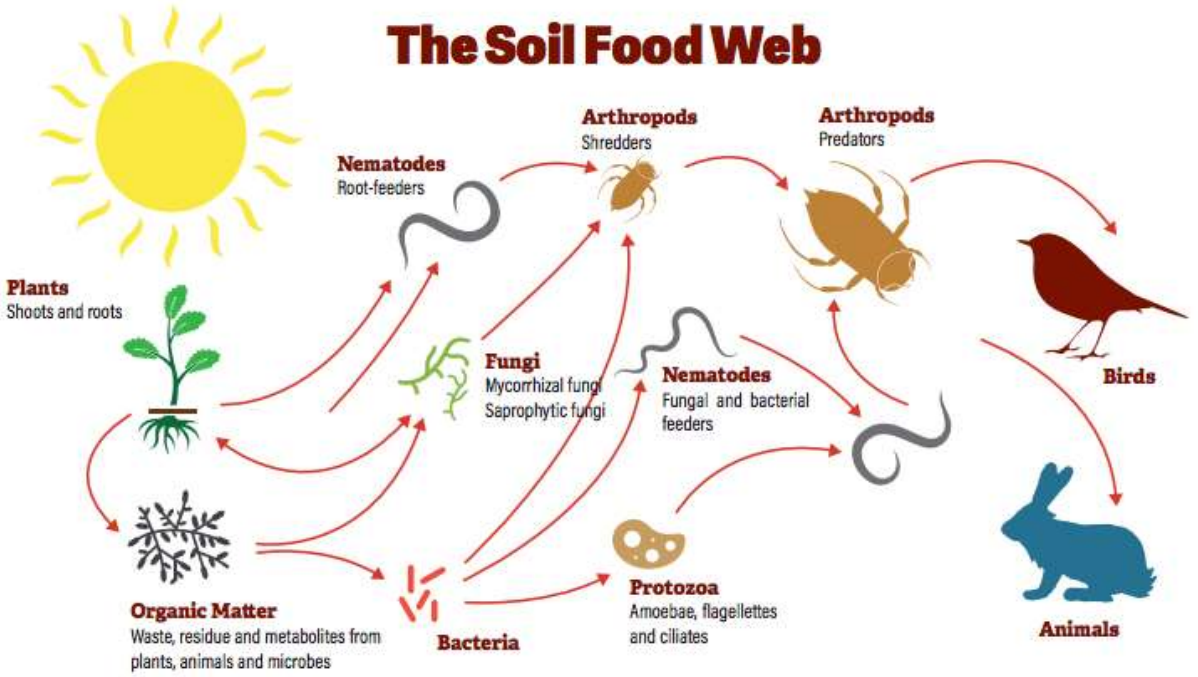
> ***"After half a century or more of scientific, chemistry-first, agriculture we have generations of farmers who even see the presence of biodiversity on their land as in conflict with their farm's food producing and income-generating potential.***

Almost inevitably, reports are pointing the finger at 'intensive agriculture'. Damian Carrington in The Guardian [13th November 2019] headlined his piece " 'Insect apocalypse' poses risk to all life on Earth, conservationists warn" and went on to state "a new report suggested half of all insects may have been lost since 1970 as a result of the destruction of nature and heavy use of pesticides.. the number of pesticide applications [in the UK] has approximately doubled in the last 25 years".

The article also states that "there are also knock-on effects on other animals, such as the spotted flycatcher which only eats flying insects. Its populations have dropped by 93% since 1967". Again, the links are being made, but between the visible predator and their visible food source.

Why are we seeing biodiversity loss in Ireland?

Should the term 'pesticide' be refined to 'insecticide'? Surely it is insecticides that are the problem? Ireland's agriculture is dominated by land that is permanently in grass, albeit that grass sward is often not permanent. According to the 'Grassland & Fodder Crops' Survey Report 2013 from DAFM's pesticide usage survey, less than one percent of sprayed hectares or active ingredients applied were insecticides. Hence, if one is seeking to correlate farmland bird loss to insect loss to insecticide use in



Ireland one must look deeper and, probably, to what is happening to soil life.

A partial answer may be found by spotting what is absent from the pesticide survey. It highlights herbicides [98% of use by weight], fungicides [1%] and molluscicides, growth regulators, seed treatments and insecticides [all <1%]. What is absent is the quantities of animal health products distributed onto pastures directly via the grazing animal or via applications of slurry or farmyard manure. Their impact on soil life needs investigation. Likewise, the impact of high fertilizer usage. Something is definitely awry in Ireland's green landscapes.

No doubt some readers will already be saying that biodiversity loss is due to the change from haymaking to silage making. It will be a well known contributing factor. Less well understood, will be the transition to single-species pasturelands and their associated short-grass, rapid-rotation grazing systems that are reliant on high, artificial nitrogen applications. They will have had a direct impact upon the visible species native to that land, but they will most likely also be impacting upon the soil life beneath them and, thus, upon the foundations of entire food chains.

The 'soil food web' defines *what biodiversity is*

The 'Soil Food Web' illustrates the linkages between soil life and terrestrial-based biodiversity. The Soil Food Web highlights the role that soil-resident life plays in linking photosynthesis [Nature's energy source] with all life forms. To disrupt soil microbial life is to break the food supply chains of all above ground insects, birds and animals, and ultimately, us humans.

On farmland, it is this disruption of soil life that has led to widespread biodiversity collapse. As stated, the use of agro-chemicals may break individual species-providing food-chain links directly, but it is only through understanding what is happening to soil life that we will appreciate what the cause of the biodiversity apocalypse is. It will also explain why it is critical to our own food security.

The soil food web drives *farm production*

An understanding of soils should be the keystone of anyone's agricultural education. In my day it started with geology. It talked about soil structure and its physical forms. Soil 'fertility' is still being misunderstood and mainly defined by N, P and K. Nobody really mentions much about soil life.

All agricultural education must begin with soils. A valuable starting point would be "A Soil Owner's Manual" by Jon Stika, 2016. It is not a long read, but it can be transformative of one's understanding. It will, however, strongly influence all that follows. It leads to 'husbandry-first' farm management.

It is important to understand that it is the soil life that feeds plants. As one may have noticed, the diagram of the Soil Food Web, does not include the consumption of plant products, either directly or indirectly [as is the case with omnivores and carnivores], and the return of the consumer's 'wastes' to the soil [which also feed soil inhabitants]. These additions complete the Soil Food Web.

Regenerative Farming Ireland recently published its Farm-2-Fork 2030 vision for Irish farming. It states, "there must now be a paradigm shift in agriculture by the mid-21st Century. Central to the change will be recognizing that we have to feed the soil organisms that feed the plants that feed humans. And it has to be done without the aid of fossil-fuel-based or mined artificial fertilizers."

The paradigm shift is that we must feed the soil life to feed our crops. We must understand the symbiotic relationships between

TOP:
The soil food web diagram

THE NUMBERS

50%

Estimated % of insects that may have been lost since 1970 as a result of the destruction of nature and heavy use of pesticides

"Farmland was for farming and the leftovers were for nature.

plants and all soil life. We must also recognize that abundant vegetative growth is well within nature's bounds. It has managed such for millennia and built up the soil carbon reserves that we are so gaily and unsustainably consuming. Looking to and knowing how nature functions is central to the rising 'Regenerative Agriculture' movement.

Soils-first will lead to *biodiversity recovery*

An underlying principle of Farm-2-Fork 2030 is that we must stop thinking that biodiversity and farming exist in separate spaces. They cannot. They must not. Future food production will require fully functioning biodiversity across all farmland. The farming community needs to take note.

To think that biodiversity can be limited to the margins is a calamitous mistake, but it is one that is also still being promoted by ecologists as the way to preserve 'biodiversity'. It shows how far our complete understanding of food webs has sunk over the last three-quarters of a century.

As suggested in The Guardian article, farmland biodiversity can recover. It will, as a result of changing farm management practices and the adoption of a soils-first approach. In doing so we will also address both the pollution and emissions concerns surrounding agriculture. Soils-first farming is that very rare thing, it is the complete package and it comes with and it comes with biodiversity regeneration included.

Agri-environment schemes *for the hotspots*

Farmland biodiversity recovery is about the management of all farmland. It is about the adoption of not just regenerative agriculture but a suit of complementary approaches. At present only 'organic' is defined by rules. Others include agroecology, holistic grazing, agroforestry, conservation agriculture and silvopastoralism. For now, regenerative agriculture is as much about a way of thinking as following prescribed rules, and it needs to be that way. It is not the latest marketing buzz word; regenerative farming is about finding food production solutions that are truly sustainable.

For some species population, collapse is catastrophic. The plight of the corncrake and curlew are such cases. Changing farming practices will benefit them, but where species are imperiled by extinction it will be insufficient. For such we need agri-environment schemes to deliver recovery.

In the Farm-2-Fork 2030 vision, such schemes were highlighted as necessary for biodiversity hotspots and they should be managed as such. Likewise, ancient and cultural landscapes. Hotspot management must not, however, be confused with broader biodiversity recovery. That must happen across all farmland, and it must be driven by farmers who recognize its true value to them.

Soils-first farming at the *core of the CAP*

The adoption of soils-first farming will transform our food systems. It will transform our agriculture.

Such will require the undoing of much of what has gone before. It is what agricultural policy must be focused upon and what agricultural support must deliver. Within the EU we must stop thinking about reforming the Common Agricultural Policy, we must first focus upon agricultural reform. The CAP must be designed to meet that need and its reform requires ground-up rethinking.

At present, few have grasped the nettle that is agrarian reform. More will have to. From the perspective of a CAP future, it is imperative that the CAP remains focused upon food production, as we are still on a journey towards sustainable food production. So far, it has taken us from just 'agriculture' to 'conventional agriculture' and now we are moving onto a myriad of ideas that will eventually be embraced by the term 'regenerative agriculture'.

RIGHT: Soil-First farming could transform our food system

> ***"we must stop thinking that biodiversity and farming exist in separate spaces"***

We have tinkered with 'greening' and that has failed. There are now advocates of redirecting the CAP towards nature by funding more agri-environment schemes. But those schemes will not actually bring about the necessary reconnection of agriculture and the environment. They will only work at the edges, and they will not bring about the reform of our food systems. And as such schemes are tax-payer reliant, they will never be truly sustainable.

Hence, we should stop thinking about the CAP as a source of funds for environmental schemes. It is tempting because the CAP is, de facto, the EU's crock of gold, but in doing so are we risking failure on two fronts, the reform of our farming-food systems and saving farmland biodiversity.

Going forwards we need two financing pots and a clear focus for each. One must be about achieving specific, localised environment goals, the other about delivering agrarian reform through targeted investment and that will, by default, deliver widespread biodiversity recovery.

Have your say. What do you think about Stuart's article? Email us and let us know at editor@agriinsider.ie