Key practices for growing ecosystems

Implementing regenerative practices can mitigate the negative effects of intensive monoculture farming and the ongoing increase in soil sealing rates.

These negative effects can include the loss of biodiversity, the loss of natural areas (for example, forests, marshes, shrub and grasslands), and increased pollution due to extensive fertiliser and pesticide use or industrial and household waste. These are undesirable outcomes on their own, but they can also lead to the decline and loss of essential ecosystem services, such as water infiltration and purification, pollution buffering, carbon storage, natural pollination and pest control, and genetic diversity. They also push our systems closer to so-called tipping points. Once a tipping point is crossed, it is impossible to buffer back. Some ecosystems might take ages to restore, and others may not be able to recover at all. Using practices to grow ecosystems not only avoids mistakes and negative “side-effects”, but it is also a smart way to make the best of nature’s services for growing good, healthy foods, while supporting long-term land stewardship and green urban development.
Two core ideas lie at the root of practices for growing ecosystems above ground: to restore natural land and diversify landscapes in general, even on a small scale; and to create wildlife areas, which can provide local and regional habitats and resources for animals, and ensure the movement of animals across landscapes.

Most often, these go hand in hand, and in practice, and cannot be separated. So, as a grower, what can you do?

Flowers

Flower strips or fields are a great way to improve the abundance and diversity of pollinators around your growing area, such as wild bees, bumblebees, butterflies and hoverflies. Wild bees including bumblebees are the heroes of pollination, and more efficient than honey bees.

To determine what kind of flower strip fits your context best, you can consider a few things. Does your growing area, or the landscape around it support pollinators with nesting sites and continuous foraging resources? What kind of crops or edible plants are you growing and does that effect which pollinators you’ll need? Depending on your conditions, you will want to use flowering areas mostly to: attract the right kind of pollinators; support pollinators in periods of resource shortage (often at the beginning and end of the growing season, but also due to surrounding monocultural landscapes); build and sustain diverse pollinator communities and colonies around your growing area long-term.

You could have flower strips and flowering plants in the form of: adjacent strips or field margins; as part of a crop rotation (planting different plants after one another on the same piece of land); as part of a multi-cropping design (planting different plants in a mixed design at the same time); or as temporary or longer-term fallows.

Sown flower strips

Sown flower strips can create additional, diverse habitats using annual and perennial flowers. These attract pollinators and natural enemies of pests by providing nectar and pollen throughout their active foraging period, especially during resource-limited times.

You can include:

- Suitable host plants for butterflies
- ‘Bridging’ plants, which flower during otherwise resource-poor periods
- Mass-flowering plants, which help to build bee colony size
- ‘Framework’ plants, which provide considerable nectar and pollen to numerous pollinator species, and may sustain a more diverse pollinator community overall.

Plants with large inflorescences, or which flower in dense patches (for example, ox-eye daisy) increase flower visitors overall. Others can attract pollinators with special skills or tools (for example, leguminous plants attract long-tongued bumblebees). Different pollinator groups have their own ‘favourite’ plants (for example, hoverflies love oregano, garlic chives, sweet alyssum, buckwheat and cornflower).
The presence of attractive plant species may result in more flower visits, but it may not automatically increase the diversity of pollinator species. It may increase competition with less abundant or attractive crops and native flowering plants. The positive effects of flower strips on wild pollinators may also take time to manifest. Whatever population size you experience at the moment reflects more on the resource availability of previous years. Test regionally important forage plants for pollinators and look for abundant plant species native to your local region. They can indicate which pollinators and natural enemies of pests are likely to be around already. Consider possible positive and negative interactions between the sown flowering plants, wild plants, and your own food plants to select a mix that improves overall resource availability for pollinators, while avoiding competition over their pollinating services.

Flowering cover crops in orchards

Often, orchards are scarce in nectar and pollen available to bees after trees bloom. In this case, flowering cover crops can provide additional resources for pollinators. Fortunately, ground plants in orchards do not compete for pollinators but strongly enhance bee abundance. Apple-dominated landscapes have drastically reduced the richness of wild bee species, even though wild bees are important and efficient orchard pollinators. Flower mixes can increase the availability of early-flowering plants in orchards. Daucus carota (highly attractive to insects generally), Trifolium repens and Lotus corniculatus (for long-tongued pollinator species) can support key groups of pollinators such as wild bees and bumblebees.

Legumes

Legume-rich borders or fallow fields will attract mostly long-tongued bee species, which specifically benefit leguminous food crops like field beans. Many pollinator-friendly leguminous cover crops also fix atmospheric nitrogen, with positive effects on soil fertility. If grasses are inter-planted with leguminous plants, they absorb a portion of nitrogen, storing it for later release when the grass is cut.

Grassland with forb flowers

Grasslands with a long-lived cover of legume and non-legume forb flowers can increase the long-term persistence of floral resources for pollinators, especially if they are minimally managed. Summer resting periods (no cutting during summer) lead to longer total flowering periods throughout the year and provide a more persistent resource for pollinators to feed on. Such meadows provide forage resources as well as suitable nesting sites for non-honeybee species such as bumblebees and solitary bees (for example, Lasioglossum morio and Andrena dorsata).
Hedgerows

Compared with flower strips, hedgerows provide longer-term sheltered habitats for some native woodland and woodland-edge pollinator and wildlife species. Hedgerows, like other non-cropped habitats, support greater numbers of beneficial insects, birds and mammals than simple landscapes. However, hedges may also pose considerable barriers for pollinators to move between more open landscapes and fields. Hedgerows help to limit soil erosion and absorb excess soil nitrogen. It is best to select hedgerow plants that support the maximum amount of locally important pollinators (framework plants) while also providing other ecological services.

Wild areas

Only the preservation and restoration of (semi-) wild habitats, including wildflower strips, forests, shrubs and grassland will maintain the overall diversity of native pollinator and wildlife communities. The restoration of habitats provides more forage and nesting possibilities, and facilitates the movement of pollinators. It is recommended that at least 7.5 - 10% of wildlife habitats are restored and protected within a region. This can double the abundance of pollinators and birds. Wild areas are characterised by limited human activities to allow natural succession, or help its acceleration (for example, selectively logging monocultural forests and supporting the regeneration of natural vegetation).

Do you have any wild areas?

Depending on their size, shape and distance from each other, flower strips, hedgerows and other wild or densely vegetated areas can become so-called stepping stones, bio-corridors or permanent habitats for wildlife and pollinators. Bio-corridors allow animals and living organisms to securely move across landscapes by providing appropriate habitats, for example, shelter material, foraging resources, protection and physical support. Stepping stones are less connected and diverse habitats, but they still provide necessary support for animals and other organisms to move and even colonise from one place to another (single trees can be stepping stones). Islands of flowering plants, trees and shrubs can facilitate the colonisation of new habitats by highly mobile species. Less mobile species rely on connected bio-corridors.

These practices help to grow ecosystems. Not only do they improve biodiversity to help pollinate your plants, but they also enhance ecosystem services in general. Most of them help to avoid runoff and erosion by improving water infiltration and by providing wind barriers. They buffer changes and extremes in temperature, and they absorb pollution and help purify and clean air, water and soils. Long-term plantings (trees and permanent forests) and areas left wild help to capture and store carbon. Many of them directly improve the well-being of people, too. Who doesn't enjoy the sight of a flowering meadow, a morning full of birdsong, or tree shade on a hot summer's day?

Also in this GROW Regenerative Practice series:

- Key practices for growing polycultures
- Key practices for growing soil
- Key practices for growing ecosystems