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ICARDA



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Regard and protect ground-nesting bees as part of soil biodiversity



For example: Andrena



EU, FAO and GSP use a **definition for soil biodiversity** focused on 4 ES provided **by** soil biota:

- driving nutrient cycling and regulation of water flow and storage,
- regulation of soil and sediment movement and biological regulation of other biota (including pests and diseases),
- soil structure maintenance and detoxification of xenobiotics and pollutants
- regulation of atmospheric composition

→ **This focus on 4 ES excludes pollinators depending on the habitat soil for regeneration**



60-70% of wild bees nest in the ground, also all solitary wasps

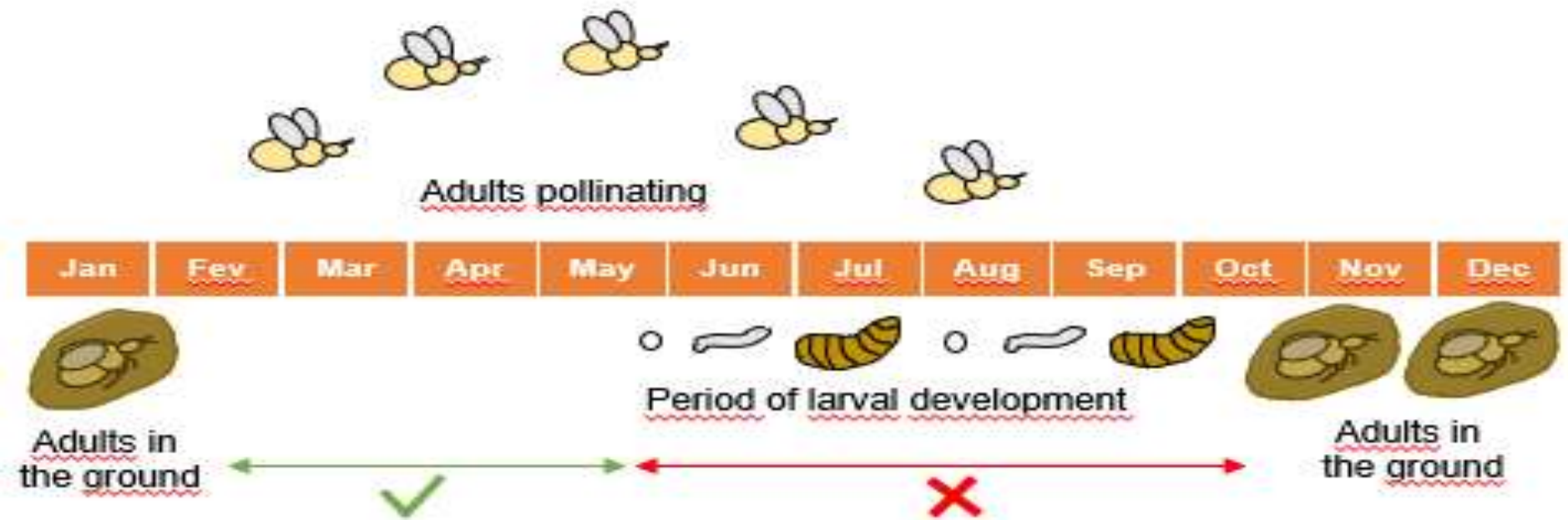
- **Fields lack** trees, hollow stems, deadwood for cavity nesting pollinators → **this increases the need for groundnesting pollinators in agricultural lands**
- **Solitary bees** (Andrenidae and Melittidae, Halictidae, Colletidae and Apidae) **don't fly far and need nests in fields**, only bumblebees fly up to several km

But

- **Tillage & chemicals endanger them**



The short flying period for pollination depends on the success of the long underground-phase



Graphic: P. Lhomme



Soil can become too toxic for the female digging while laying eggs

Chan et al. 2019

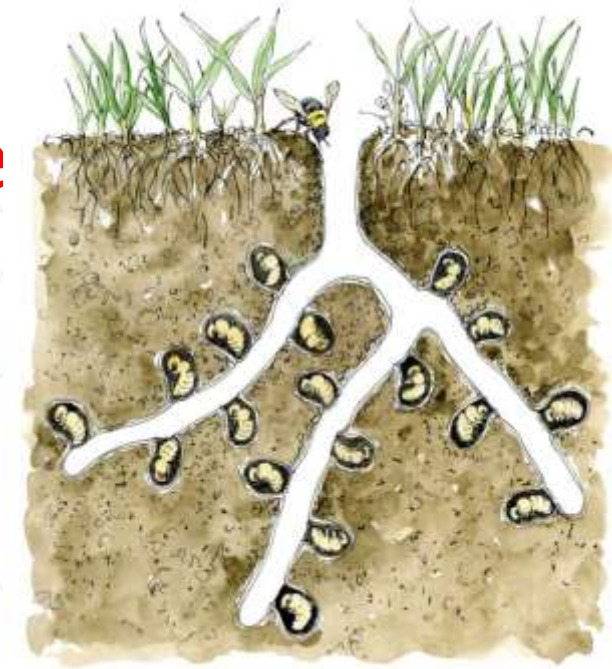
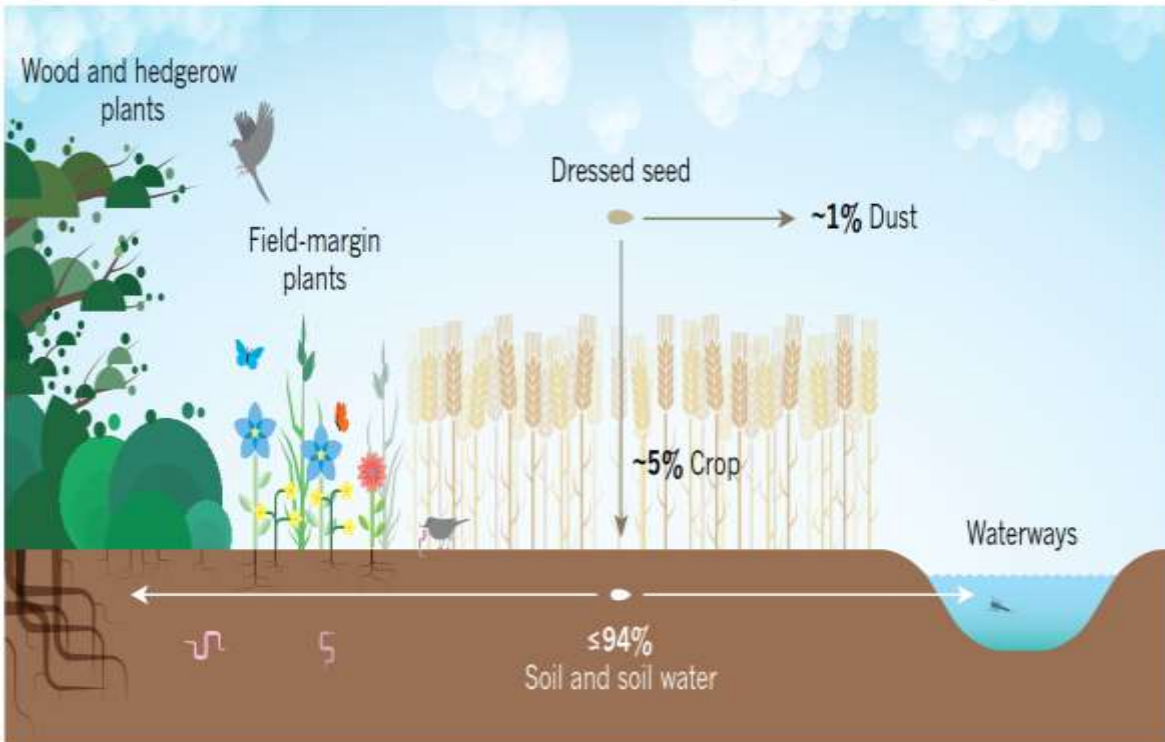


Illustration: Elayne Sears



Neonicotinoids – where do they accumulate?

Goulson 2014

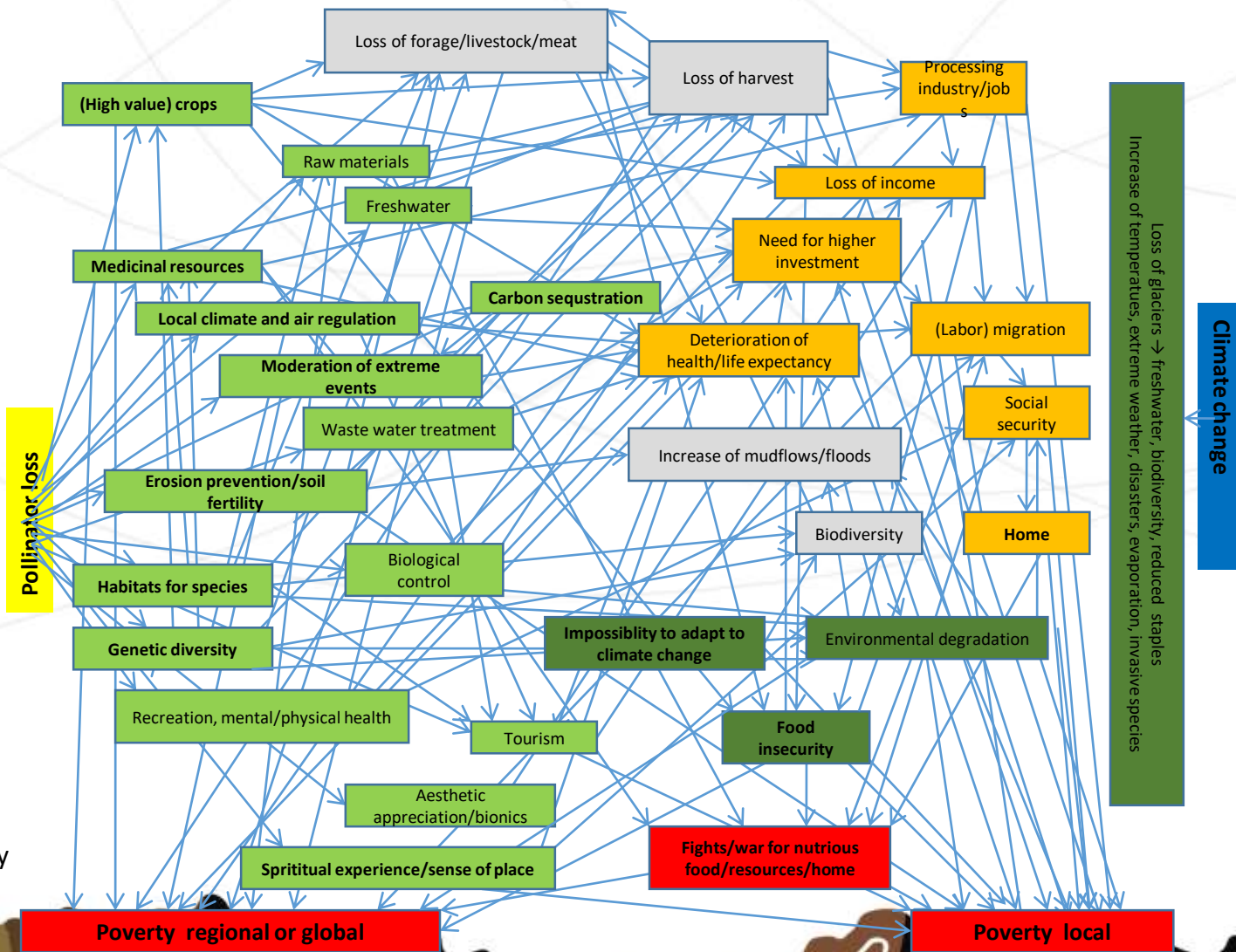
87% of flowering plants require pollinators

→ **All ecosystem services depend to a high extent on pollinators and decline of ES can cause interlinked degradation and poverty spirals** (Christmann 2019)

Conservation measures for soil biodiversity and combat of erosion would be hampered without pollinators



The Pollinator-Loss-Syndrom would fuel also deterioration of soil biodiversity and its negative impacts



Christmann 2019, Restoration Ecology



Soil biodiversity is the variation in soil life, from genes to communities, and the ecological complexes of which they are part, that is from soil micro-**habitats** to landscapes (**CBD**)

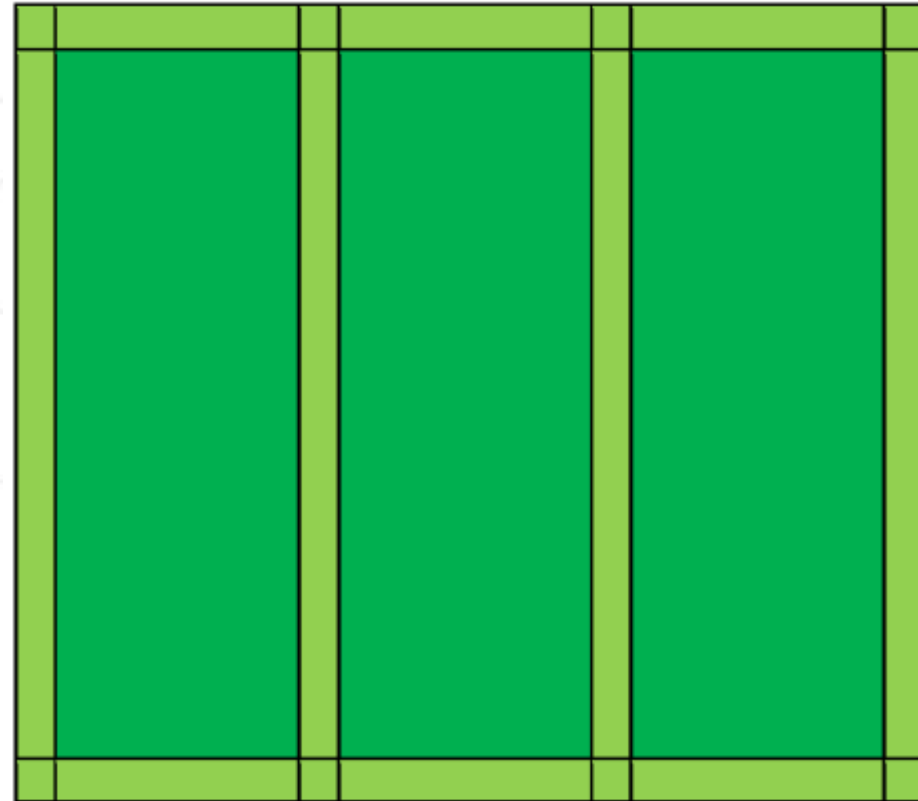
For **groundnesting** pollinators:

Main crop

Habitat zone with **PERENNIAL** and annual marketable habitat enhancement plants (MHEP) and in between areas with reduced ploughing; dead wood, hollow stems

Farming with Alternative Pollinators (FAP)

(Christmann & Aw-Hassan 2012; Christmann et al. 2017; Christmann 2019)





WPP

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www.WPP-we-protect-pollinators.org/



**Thank you for
your attention**