Targeted Biodiversity Management to Support Sustainable Farming

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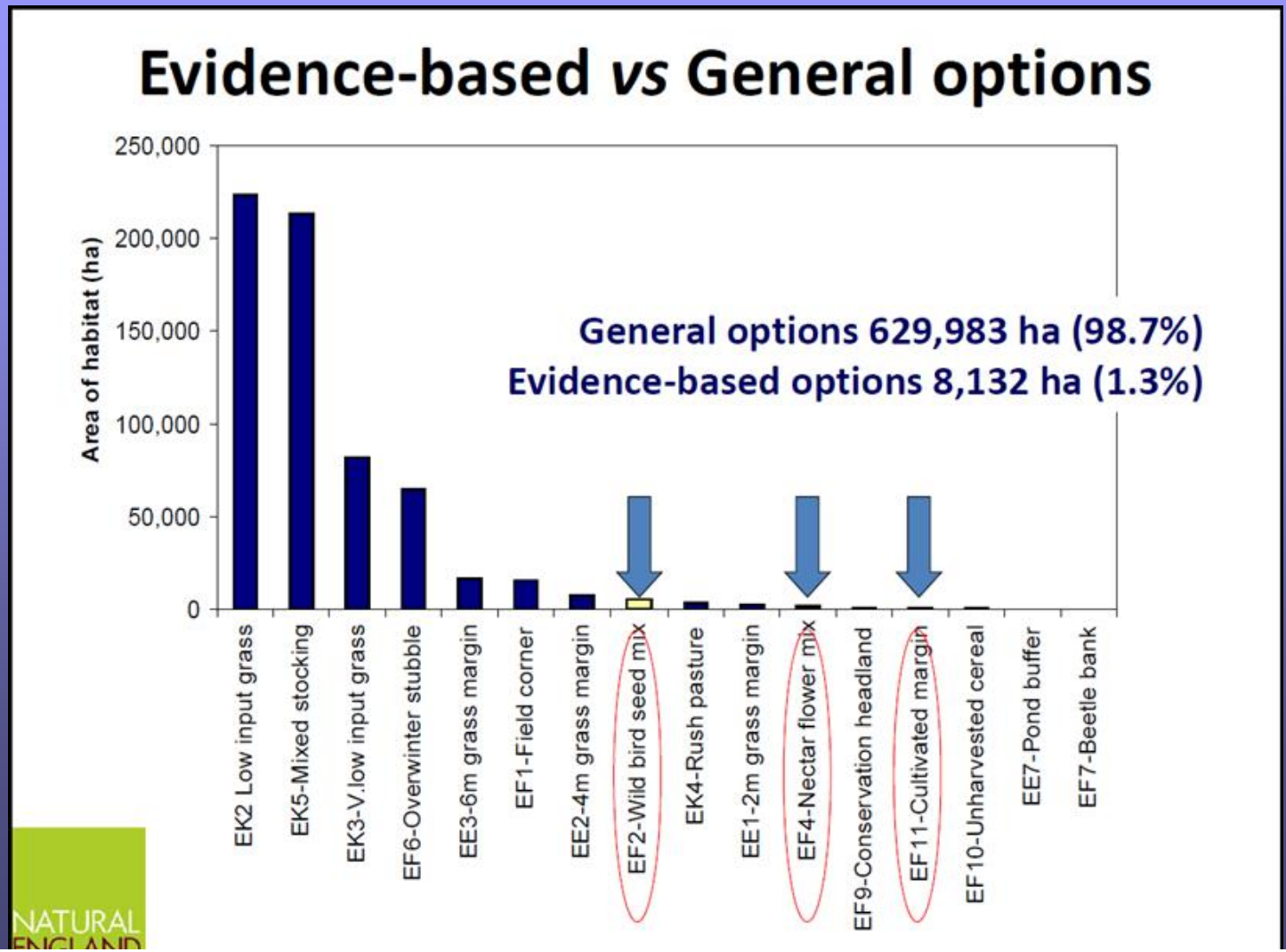
Biodiversity Decline

Agri-Environment Schemes

Agriculture → **Environment**

Focus on Nature Conservation

Farmers choose general options (= least ecological impact)



Agriculture → **Environment**

Focus on Ecosystem Services

Biodiversity Works for Farmers

€90 miljard/jaar
(*Constanza 1997*)

€320 miljard/jaar

How to optimize Ecosystem Services?

Different organisms

Different requirements

One size fits all?

Tailor made

(Wäckers and van Rijn, 2012)

Different organisms Different requirements

family	species	Floral Nectar depth	Longevity (AFLI) Hoverfly *E. balteatus*	Lacewing *C. carnea*	Parasitoids	References parasitoids (species)
Apiaceae	*Ammi majus*	0	+	+	-	Geneau et al., unpubl. (*Microplitis mediator*)
Apiaceae	*Coriandrum sativum*	0	+		+/-	Vattala et al., 2006 (*Microtonus hyperodae*)
Apiaceae	*Daucus carota*	0	+	++	+	Winkler et al., 2009 (*Cotesia glomerata*)
Apiaceae	*Foeniculum vulgare*	0	+		+	Winkler et al., 2009 (*Cotesia glomerata*)
Apiaceae	*Heracleum spondylium*	0	+		+/-	Winkler et al., 2009 (*Cotesia glomerata*)
Apiaceae	*Pastinaca sativa*	0	+	++	+/-	Foster & Ruessink, 1984 (*Meteorus rubens*)
Polygonaceae	*Fagopyrum esculentum*	0	+	+	+	Winkler et al., 2009 (*Cotesia glomerata*)
Boraginaceae	*Borago officinalis*	0	+	++	-	Nilsson et al., unpubl. (*Trybliographa rapae*)
Ranunculaceae	*Ranunculus acris*	0	+		-	Kehrli & Bacher, 2008 (*Minotetrastichus frontalis*)
Caryophyllaceae	*Gypsophila elegans*	1	+	++		
Asteraceae	*Matricaria chamomilla*	1	+	+	-	Nilsson et al., unpubl. (*Trybliographa rapae*)
Asteraceae	*Achillea millefolium*	1	+	+/-	-	Wäckers 2004 (*Cotesia glomerata*)
Asteraceae L	*Cichorium intybus*	1	-	+		
Asteraceae	*Chrysanthemum segetum*	2	+	+		
Asteraceae	*Anthemis tinctoria*	2	+/-	+/-		
Asteraceae	*Leucanthemum vulgare*	2	+/-	+	-	Wäckers 2004 (*Cotesia glomerata*)
Asteraceae	*Tanacetum vulgare*	2	-	+/-		
Asteraceae	*Calendula officinalis*	3	-		-	Rahat et al., 2005 (*Trissolcus basalis*)
Asteraceae	*Centaurea cyanus* (+EFN)	3	+	++	+/-	Winkler et al., 2009 (*Cotesia glomerata*)
Asteraceae	*Helianthus annuus* (+EFN)	3	+	+		
Asteraceae	*Cosmos bipinnatus*	4	-	+/-	+	Rahat et al., 2005 (*Trissolcus basalis*)
Malvaceae	*Malva sylvestris*	4	-		-	
Boraginaceae	*Phacelia tanacetifolia*	4	+/-	+/-	-	Irvin et al., 2007 (*Gonatocerus* spp.)
Fabaceae	*Medicago sativa*	4	-		-	Kehrli & Bacher, 2008 (*Minotetrastichus frontalis*)
Fabaceae	*Vicia sativa* (+EFN)	4	+		++	Geneau et al., unpubl. (*Microplitis mediator*)
Fabaceae	*Lotus corniculatus*	4	-			



(Campbell, Biesmeijer Varma & Wäckers, 2012)

Different Flowers support different Ecosystem services

Pollinators



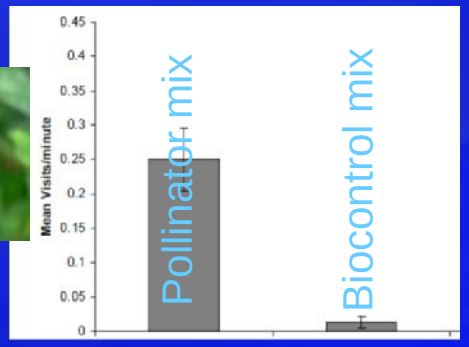

Pest Natural Enemies
(Natural Pest Control)

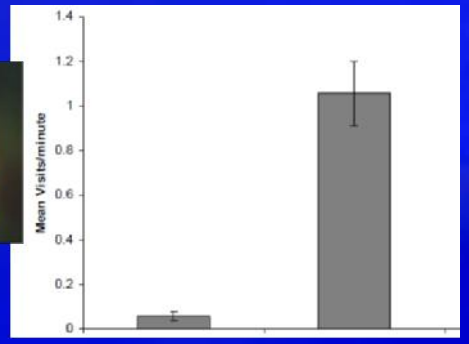


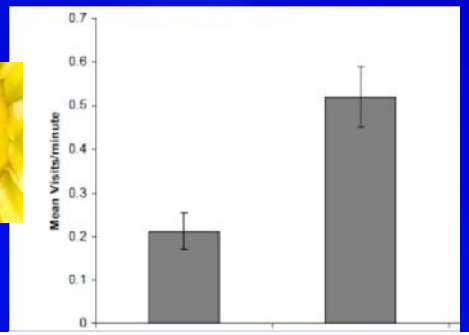


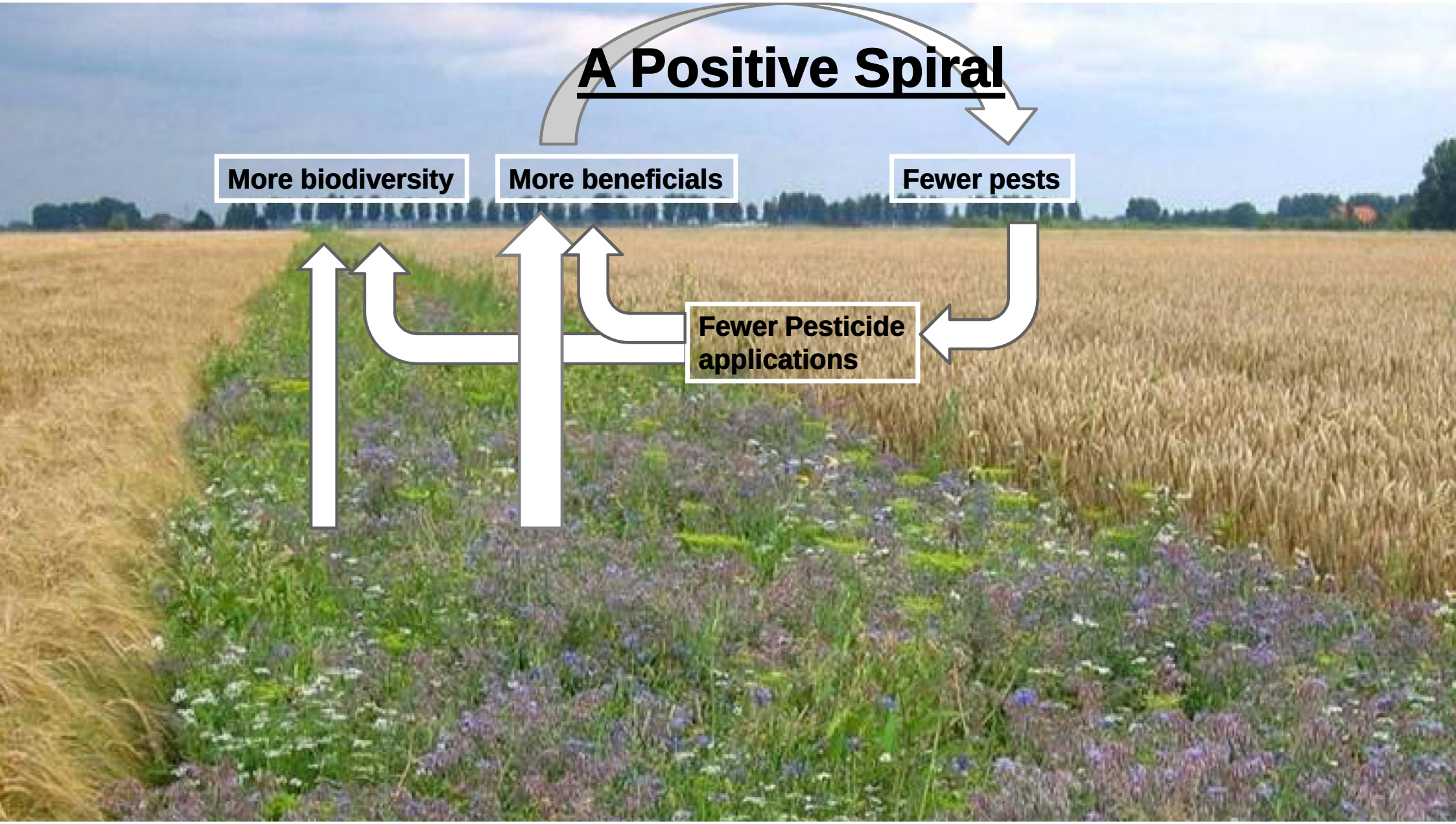
(Campbell, Biesmeijer Varma & Wäckers, 2012)

Different Flowers support different Ecosystem services





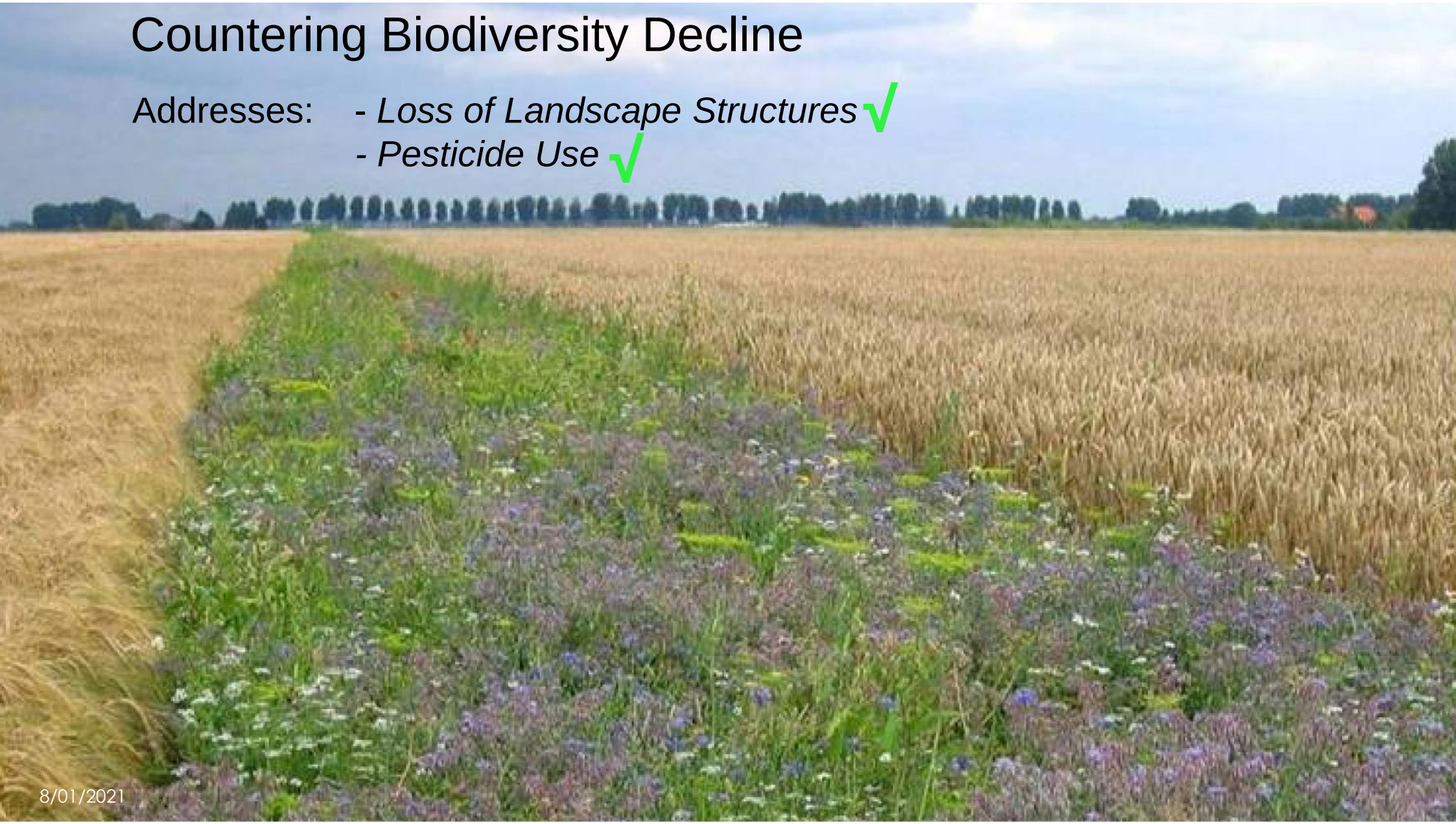



A Positive Spiral
More biodiversity
More beneficials
Fewer pests
Fewer Pesticide applications

Countering Biodiversity Decline

Addresses: - *Loss of Landscape Structures* √

- *Pesticide Use* √



Thanks