

Knowledge exchange WUR, Aarhus University & ILVO

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ILVO



Agroecology: A new path for European agriculture? The agroecological principles



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Ecological strategy og agroecology

- Changing fossil fuels trough exosystem services served by biodiversity
- Investing in biodiversity at every level



Delivered ecosystem services by biodiversity

- **Managing crop diseases** → living soil (reduced tillage, high carbon input), reducing the use of fast working manure
- **Managing harmful organisms** by a good designed ecological network → populations of natural enemies
- **Weed management** → temporary grassland with legumes, complex mixes of cover crops, competing cultivars, long and varied crop rotations,...

Delivered ecosystem services by biodiversity

- **Fixating nitrogen** → perennial and annual legumes .
Partially available nitrogen for non-legumes annual crops
→ interesting revenues

Functions of temporary graslands, cover crops and an ecological network

	Managing		
	Weeds	Deseases	Harmful organisms
Temporary graslands	XXX	X	X
Biomax, cover crops	XX	XXX	XX
Perennial cover	XX	XX	XX
Grass borders, ...	-	-	XXX

Ecological infrastructures

Herbaceous strip ↗ natural enemies of plagues in crops



Ecological infrastructure

Herbaceous strips  natural enemies of plagues in crops



Hoverfly, larve and adult



Carabide, adult and larvae

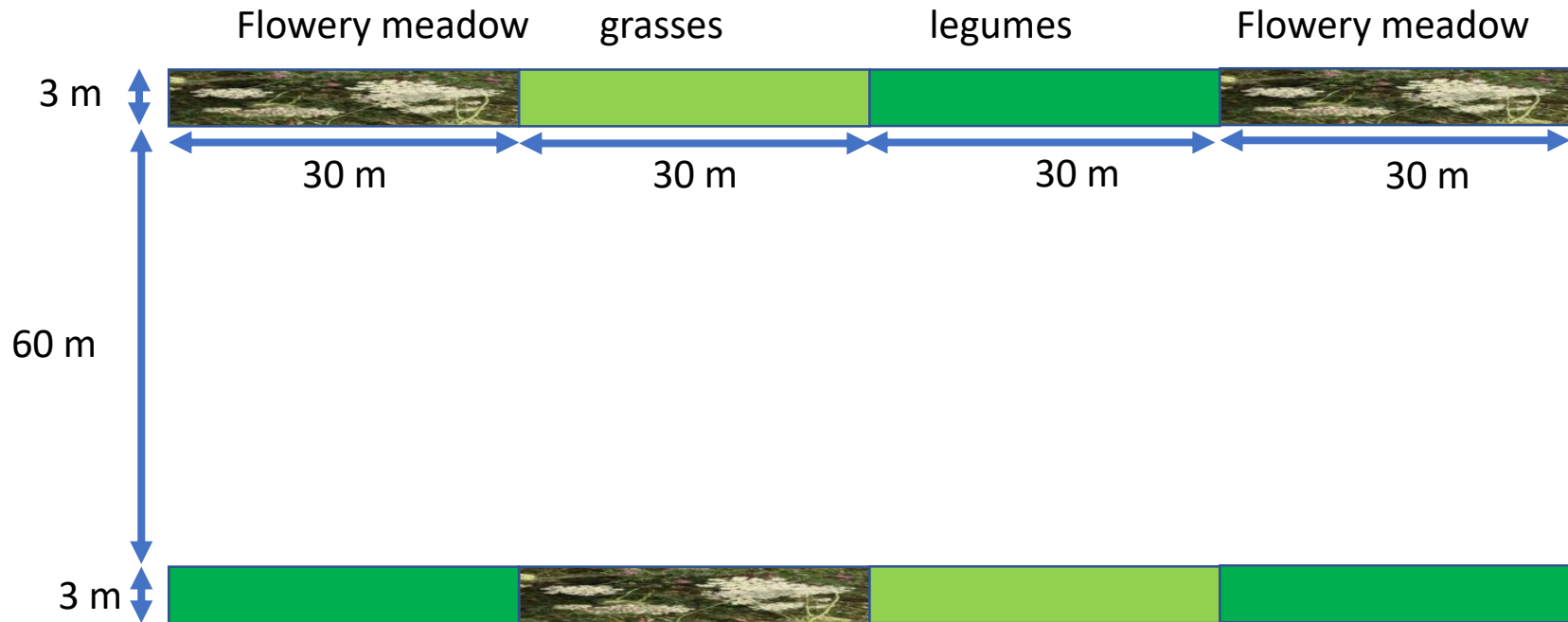


Development of grass strips: an exemple



Development of grass strips: the rules

Dimensions des bandes herbeuses



Weed management

Basic principles:

Plants (main crops and cover crops)
manage other plants (weeds)

	Proactive management
Temporary grassland	XXX
Biomax	XX
Permanent cover	XX
Choice of crops (species)	X
Choice of genetics (cultivars)	X
Mixing cultures	XX

Blés sélectionnés en bio

GRAZIARO



Designing crop rotation and soil regeneration

Temporary grasslands based on legumes

- Storing carbon
- Restore soil fertility, -structure and –life
- Fixing important amounts of nitrogen in the soil
- Managing perennial and annual weeds



Biomax = complex mix of cover crops

Biomax rolling and sowing in one workflow



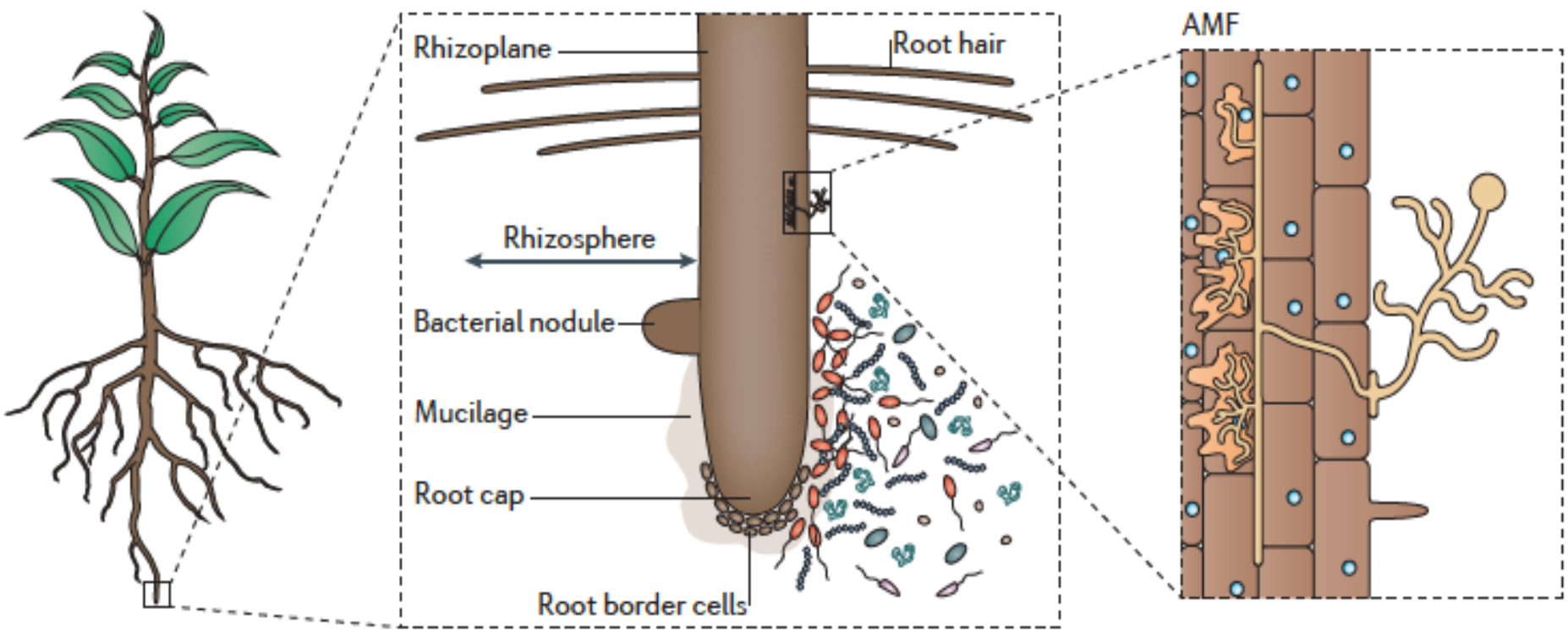
Triticale sown at a permanent cover of white clover = perennial cover



Triticale sown at a permanent cover of white clover

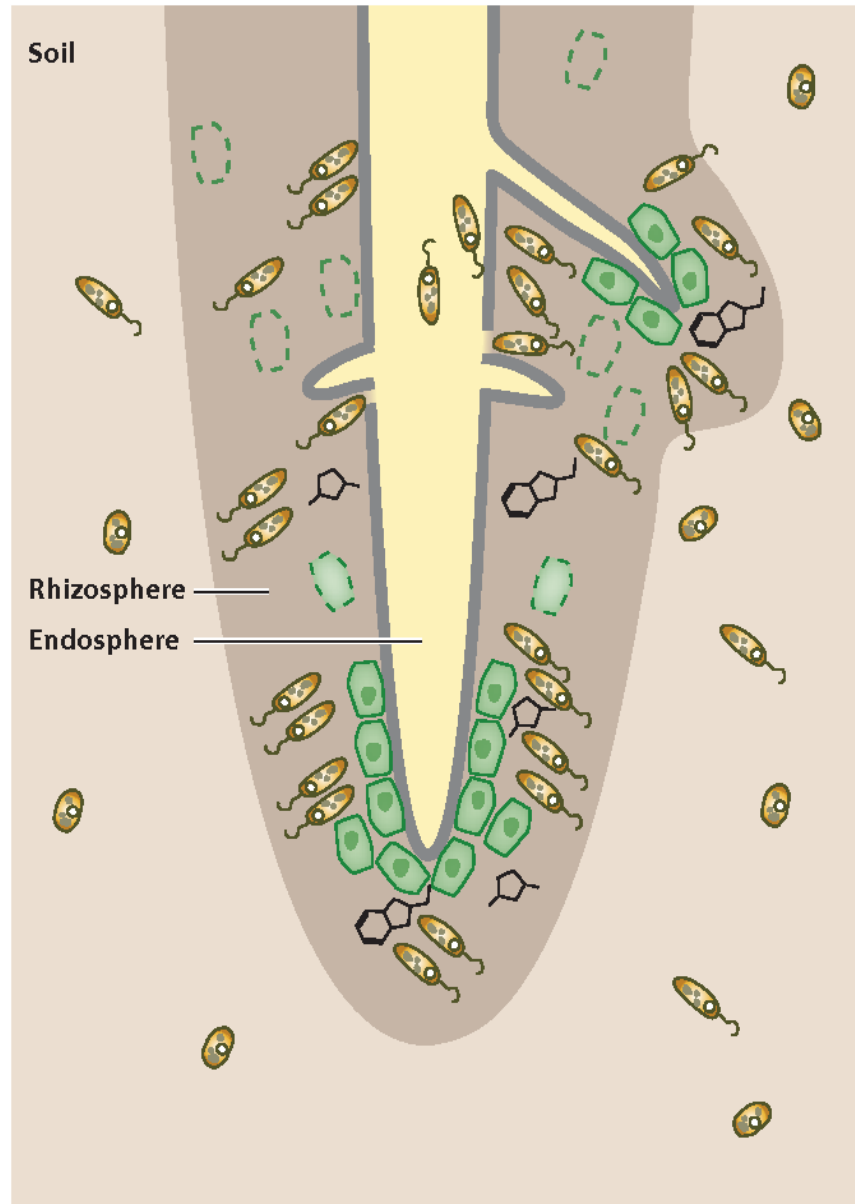




De rhizosphere



Philippot et al. 2013

De rhizosphere en de endosphere



-  Bacteria
-  Living root cap border cell

Functions of temporary graslands, restoring the soil and the ecological network

	Storing carbon	Restoring soil life	Fixating nitrogen
Temporary grassland	XXX	XX	XXX
Biomax, cover crops	XX	XXX	X
Grasstroken, ...	-/X	XX	-

Grass strips = 'nature reserves' for:

- Mycorrhiza funghi, earth worms, etc.
- Spiders
- Carabids en other insects
- Field and meadow birds
- Mammals like rabbits, ...

Main elements

Stop killing soil life

With weapons of mass destruction:

- Plowing
- Deep rotory harrow

➔ Other strategies to manage weeds

Prioritary solutions:

- Expanding and diversifying the crop rotation
- Temporary grassland in the crop rotation
- Biomax (complex mix of cover crops)
- Mulching (dead organic material)
- Competing crops

Main elements

Feeding the soil life

Carbon sources:

- **Solid carbon:** Crop rests, cover crops, manure, RCW, ...
 - Regular inputs are better than one big annual input
- **Liquid carbon:** Exudates of living plants: always a covered soil
 - Main crops (inclusive relay cropping)
 - Biomax in the interculture
 - With main crop(s) sown cover crops, inclusively small weeds

Economische strategie van agroecologie

Added value



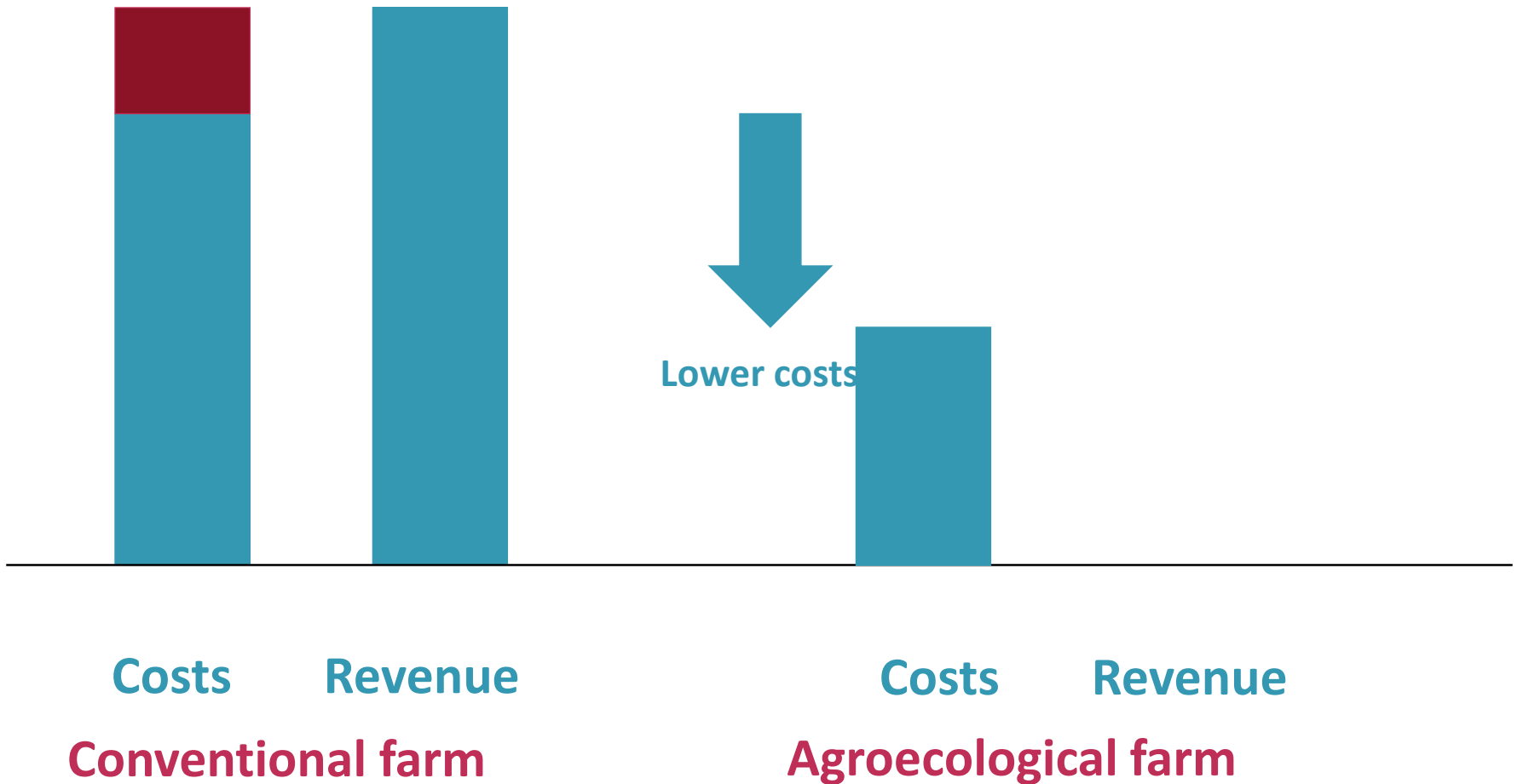
Costs

Revenue

Conventional farm

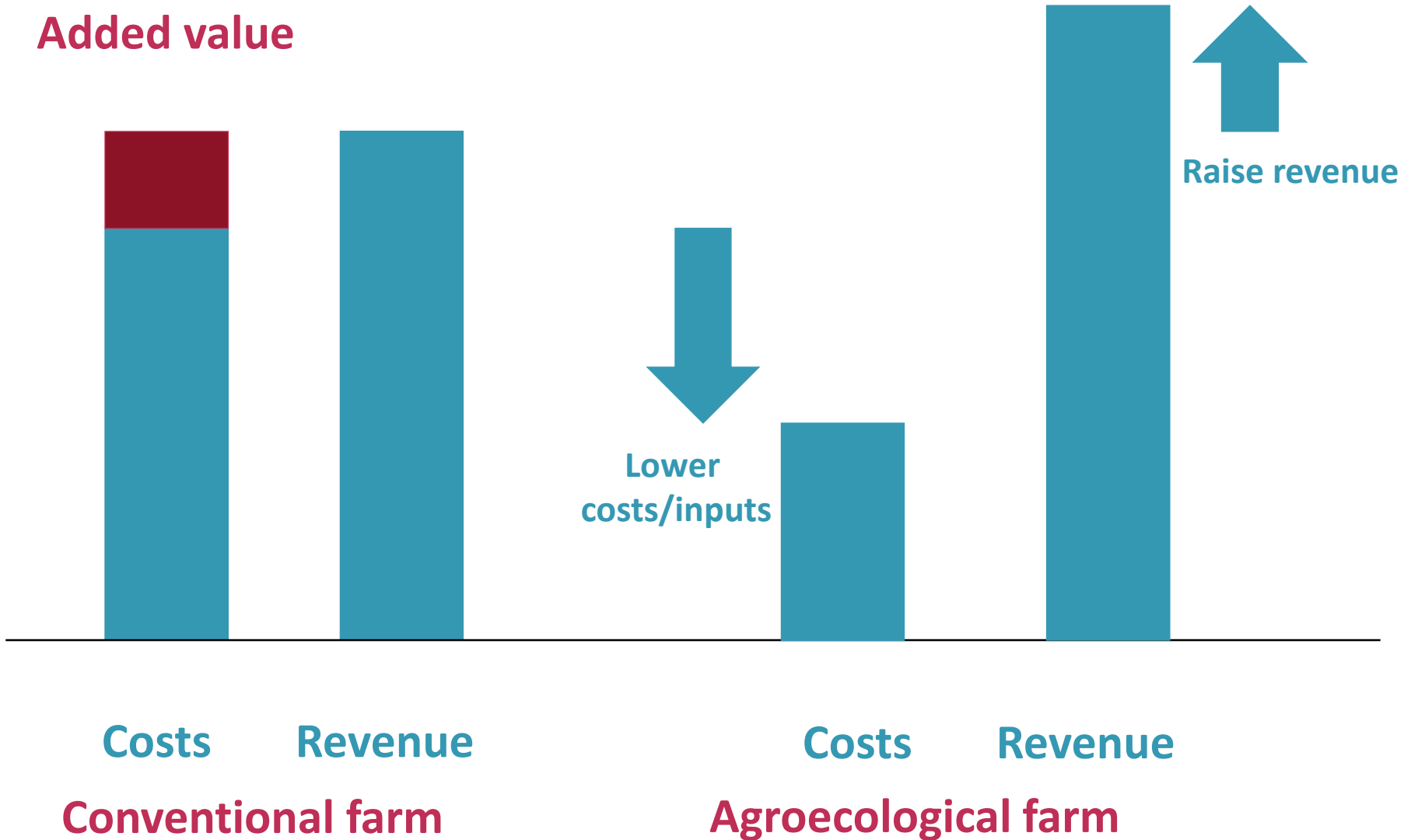
Economische strategie van agroecologie

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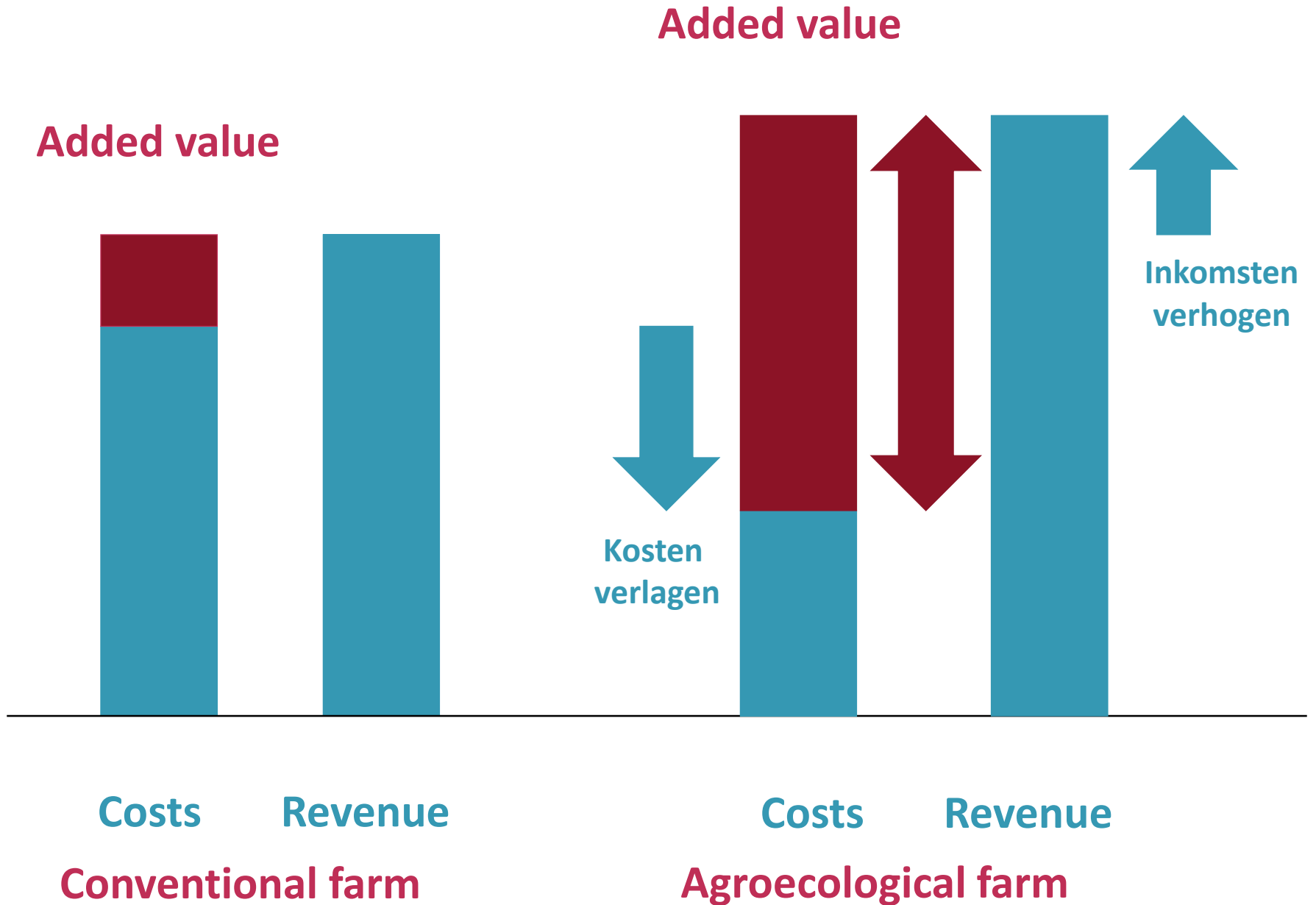


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Added value



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Thank you

www.agroecology-europe.org

www.terres-vivantes.net