Wildflowers on field margin (Jean-Pol GRANDMONT)

Flower strips on paths within crops to support functional agrobiodiversity (Netherlands)

FAB-randen in het spuitspoor

DESCRIPTION

Flower strips are established on arable crop access paths to attract and support natural enemies to control and decrease crop pests

Planting flower strips to provide nectar and pollen to attract beneficial insect species that can help control pests is a well-known and well-used technology in the arable dominated South-West of the Netherlands. The use of such wildflower strips is increasingly being used across the world. Usually these wildflower strips are planted in bands around the edge or through the middle of a crop field.

This technology describes an interesting experiment that aims to see if it is more beneficial to establish several smaller flower strips between the crops to attract functional agrobiodiversity benefits to be compared to a smaller number of wider flower strips as is the standard practice.

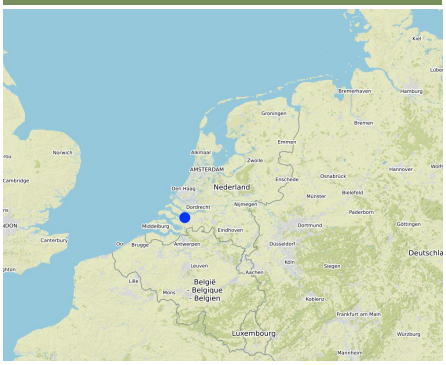
The technology is being tested on 2 parcels of land that contain 2 different crops in the South-West of the Netherlands using these micro-flower strips, each approximately 0.5 meters wide, alongside access tracks running through the crops. The premise is these small strips can be effective spaces to increase the number of wild flowers present alongside a crop for the functional agrobiodiversity benefits without needing to use productive crop land.

Overall, the technology ultimately reduces the requirement for spraying of pesticides to control problematic species, thus improving the health and production of the crops while reducing the cost and environmental impact of spraying pesticides.

This trial design for a well-known technology has proven to be successful if designed and implemented well. The increased locations in closer proximity to the crop supported beneficial species presence. However, how different this is compared to standard application of wildflower strip technology is still to be fully understood, especially when considering the slightly more challenging application of the trial technology design.

The technology trial is supported by the EU Interreg FABulous Farmers project.

LOCATION



Location: Dinteloord, Noord-Brabant, Netherlands

No. of Technology sites analysed: 2-10 sites

Geo-reference of selected sites

- 4.3398, 51.62975
- 4.3398, 51.62975

Spread of the Technology: applied at specific points/ concentrated on a small area

In a permanently protected area?: No

Date of implementation: 2019

Type of introduction

- ☑ through land users' innovation
- ☐ as part of a traditional system (> 50 years)
- ☐ during experiments/ research
- ☑ through projects/ external interventions

Wildflower field margin (Sarandab)

CLASSIFICATION OF THE TECHNOLOGY

Main purpose

- improve production
- reduce, prevent, restore land degradation
- conserve ecosystem
- protect a watershed/ downstream areas – in combination with other Technologies
- ✓ preserve/ improve biodiversity
- reduce risk of disasters
- adapt to climate change/ extremes and its impacts
- mitigate climate change and its impacts
- create beneficial economic impact
- create beneficial social impact
- ✓ Provide habitat for functional agrobiodiversity to control pests

Land use

Land use mixed within the same land unit: No

Cropland

- Annual cropping

Number of growing seasons per year: 1
Is intercropping practiced? Yes
Is crop rotation practiced? No

Water supply

- rainfed
- ✓ mixed rainfed-irrigated
- full irrigation

Purpose related to land degradation

- prevent land degradation
- reduce land degradation
- restore/ rehabilitate severely degraded land
- adapt to land degradation
- ✓ not applicable

Degradation addressed

biological degradation - Bh: loss of habitats

SLM group

- integrated pest and disease management (incl. organic agriculture)

SLM measures

vegetative measures - V5: Others

TECHNICAL DRAWING

Technical specifications

There are two sorts of flower strips. One strip 3 meters wide and several small strips 0.5 meters wide. The wide strip will be established along the edge of the fields. The small strips will be established within the crops. The distance between the small strips will be varied in order to investigate the effect of spacing.

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ESTABLISHMENT AND MAINTENANCE: ACTIVITIES, INPUTS AND COSTS

Calculation of inputs and costs

- Costs are calculated: per Technology area (size and area unit: **0.5m wide 'micro-strip'**)
- Currency used for cost calculation: **Euro**
- Exchange rate (to USD): 1 USD = 0.85 Euro
- Average wage cost of hired labour per day: 150

Most important factors affecting the costs

The price of seed mix required. If implementing this technology in a new area the cost of equipment would also be required, but not required at this site as the general practice of wildflower strips is already being used.

Establishment activities

1. Planting of wildflower strips alongside access paths (Timing/ frequency: Spring)
2. Planting of larger wildflower stip alongside boarder of crop field (Timing/ frequency: Spring)

Establishment inputs and costs (per 0.5m wide 'micro-strip')

Specify input	Unit	Quantity	Costs per Unit (Euro)	Total costs per input (Euro)	% of costs borne by land users
Labour					
Seeding wildflower strips	150m strip	6.0	15.0	90.0	100.0
Equipment					
Tractor & attchments (already owned)	1	1.0			100.0
Plant material					
Wildflower seed mix	per 150m strip	6.0	50.0	300.0	
Total costs for establishment of the Technology				**390.0**	
Total costs for establishment of the Technology in USD				*458.82*	

Maintenance activities

n.a.

NATURAL ENVIRONMENT

Average annual rainfall

- ☐ < 250 mm
- ☐ 251-500 mm
- ☐ 501-750 mm
- ☑ 751-1,000 mm
- ☐ 1,001-1,500 mm
- ☐ 1,501-2,000 mm
- ☐ 2,001-3,000 mm
- ☐ 3,001-4,000 mm
- ☐ > 4,000 mm

Agro-climatic zone

- ☐ humid
- ☐ sub-humid
- ☑ semi-arid
- ☐ arid

Specifications on climate

Average annual rainfall in mm: 875.0
800-950 mm
Name of the meteorological station: KNMI

Slope

- ☑ flat (0-2%)
- ☐ gentle (3-5%)
- ☐ moderate (6-10%)
- ☐ rolling (11-15%)
- ☐ hilly (16-30%)
- ☐ steep (31-60%)
- ☐ very steep (>60%)

Landforms

- ☑ plateau/plains
- ☐ ridges
- ☐ mountain slopes
- ☐ hill slopes
- ☐ footslopes
- ☐ valley floors

Altitude

- ☑ 0-100 m a.s.l.
- ☐ 101-500 m a.s.l.
- ☐ 501-1,000 m a.s.l.
- ☐ 1,001-1,500 m a.s.l.
- ☐ 1,501-2,000 m a.s.l.
- ☐ 2,001-2,500 m a.s.l.
- ☐ 2,501-3,000 m a.s.l.
- ☐ 3,001-4,000 m a.s.l.
- ☐ > 4,000 m a.s.l.

Technology is applied in

- ☐ convex situations
- ☐ concave situations
- ☑ not relevant

Soil depth
- very shallow (0-20 cm)
- shallow (21-50 cm)
- moderately deep (51-80 cm)
- ✓ deep (81-120 cm)
- very deep (> 120 cm)

Soil texture (topsoil)
- coarse/ light (sandy)
- ✓ medium (loamy, silty)
- fine/ heavy (clay)

Soil texture (> 20 cm below surface)
- coarse/ light (sandy)
- ✓ medium (loamy, silty)
- fine/ heavy (clay)

Topsoil organic matter content
- high (>3%)
- ✓ medium (1-3%)
- low (<1%)

Groundwater table
- on surface
- ✓ < 5 m
- 5-50 m
- > 50 m

Availability of surface water
- excess
- ✓ good
- medium
- poor/ none

Water quality (untreated)
- good drinking water
- poor drinking water (treatment required)
- ✓ for agricultural use only (irrigation)
- unusable

Water quality refers to: both ground and surface water

Is salinity a problem?
- Yes
- ✓ No

Occurrence of flooding
- Yes
- ✓ No

Species diversity
- high
- ✓ medium
- low

Habitat diversity
- high
- ✓ medium
- low

CHARACTERISTICS OF LAND USERS APPLYING THE TECHNOLOGY

Market orientation
- subsistence (self-supply)
- mixed (subsistence/ commercial)
- ✓ commercial/ market

Off-farm income
- ✓ less than 10% of all income
- 10-50% of all income
- > 50% of all income

Relative level of wealth
- very poor
- poor
- ✓ average
- rich
- very rich

Level of mechanization
- manual work
- animal traction
- ✓ mechanized/ motorized

Sedentary or nomadic
- ✓ Sedentary
- Semi-nomadic
- Nomadic

Individuals or groups
- ✓ individual/ household
- groups/ community
- cooperative
- employee (company, government)

Gender
- women
- ✓ men

Age
- children
- youth
- ✓ middle-aged
- elderly

Area used per household
- < 0.5 ha
- 0.5-1 ha
- 1-2 ha
- 2-5 ha
- 5-15 ha
- 15-50 ha
- ✓ 50-100 ha
- 100-500 ha
- 500-1,000 ha
- 1,000-10,000 ha
- > 10,000 ha

Scale
- small-scale
- ✓ medium-scale
- large-scale

Land ownership
- state
- ✓ company
- communal/ village group
- individual, not titled
- individual, titled

Land use rights
- open access (unorganized)
- communal (organized)
- leased
- ✓ individual
- ✓ partnership

Water use rights
- open access (unorganized)
- communal (organized)
- leased
- individual

Access to services and infrastructure

health	poor	✓ good
education	poor	✓ good
technical assistance	poor	✓ good
employment (e.g. off-farm)	poor	✓ good
markets	poor	✓ good
energy	poor	✓ good
roads and transport	poor	✓ good
drinking water and sanitation	poor	✓ good
financial services	poor	✓ good

IMPACTS

Socio-economic impacts

crop quality — decreased ✓ increased

Reduced pests of crops with increased number of beneficial species for pollination and competition has reduced the crop stress and disease improving the crop quality.

expenses on agricultural inputs — increased ✓ decreased

Use of wildflower stips has reduced requirement for pesticide application

Socio-cultural impacts

Ecological impacts

beneficial species (predators, earthworms, pollinators) — decreased ✓ increased

Reduced pests on crops with increased number of

pest/ disease control	decreased ✓ increased	beneficial species for pollination and competition has reduced crop stress and disease improving the crop quality. Reduced pests on crops with increased number of beneficial species for pollination and competition has reduced crop stress and disease improving the crop quality.

Off-site impacts

COST-BENEFIT ANALYSIS

Benefits compared with establishment costs

Short-term returns	very negative	✓ very positive
Long-term returns	very negative	✓ very positive

Benefits compared with maintenance costs

Short-term returns	very negative	✓ very positive
Long-term returns	very negative	✓ very positive

The technology has shown a positive outcome of the use of micro-strips of a similar outcome to the use of wider wildflower strips. Generally the use of wildflower strips is very positive for the control of pests and increase in beneficial species.

CLIMATE CHANGE

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ADOPTION AND ADAPTATION

Percentage of land users in the area who have adopted the Technology

- ✓ single cases/ experimental
- 1-10%
- 11-50%
- > 50%

Of all those who have adopted the Technology, how many have done so without receiving material incentives?

- ✓ 0-10%
- 11-50%
- 51-90%
- 91-100%

Has the Technology been modified recently to adapt to changing conditions?

- Yes
- ✓ No

To which changing conditions?

- climatic change/ extremes
- changing markets
- labour availability (e.g. due to migration)

CONCLUSIONS AND LESSONS LEARNT

Strengths: land user's view

- Utilises the space alongside paths within a crop rather than taking over larger areas on the borders of field (though often these are marginally productive areas anyway so almost a swap like for like).

Strengths: compiler's or other key resource person's view

- Places the wildflowers, and thus the beneficial species, nearer to the crops in the centre of the field.
- Reduces the requirement for pesticide use.

Weaknesses/ disadvantages/ risks: land user's view → how to overcome

- More challenging to plant wildflowers in smaller strips in between crops compared to the use of wider strips.
  → Tractor atachment technology development specifically for implementation could be developed

Weaknesses/ disadvantages/ risks: compiler's or other key resource person's view → how to overcome

- Potentially more challenging to plant and harvest crop with more diverse intercropping with wildflowers → Well designed intercropping practice this issue can be overcome

REFERENCES

Compiler
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Reviewer
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Resource persons
Tijmen Hoogendijk - co-compiler
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Full description in the WOCAT database
https://qcat.wocat.net/en/wocat/technologies/view/technologies_5381/

Linked SLM data
n.a.

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Institution

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Project

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