



# Biodiversity enhancement through rotation and strips



## Farmer's name

João Freire



## Contact

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## Name of the farm

Campotec Agro



## Country

Portugal



## Description of the farm context

Size: 40 hectares.

Type of crops: Baby leaf (young leaves).

Soil: Sandy.

Climate: Low rainfall and water scarcity in the farm's region is a critical issue.

## Partner Organization



## AdvisoryNetPEST

The **AdvisoryNetPEST** project aims to create a **network** and **upgrade advisory services** across the EU to increase the sharing of knowledge and the **adoption of innovative solutions to reduce the use and risks of pesticides** (RURP) in all **EU Member States**, enabling the agricultural sector to achieve the targets proposed by the Farm to Fork Strategy.



[AdvisoryNetPEST](#)



[www.advisorynetpest.eu](http://www.advisorynetpest.eu)

The practices identified in this project are called 'Novel Approaches' and abbreviated as 'NA'

## THE TECHNIQUE

### Short Description:

To enhance biodiversity, an evaluation of the specific plot, recommendations are made on the mixtures to implement, both in the strips and in the rotation. The impact is then evaluated

### Crop Sector:

Vegetable

### Targeted pest and diseases:

Powdery and downy mildew

### Objective of the NA:

The mixture used consisted of ryegrass, mustard, and two types of clover. After surveying and characterizing the plot (main crops; production seasons; production problems and/or constraints; functional biodiversity; soil physico-chemical analysis and assessment of soil quality bioindicators: arthropods, microbiology), the most suitable biodiverse mixtures are defined in close collaboration with seed specialists. Subsequently, the impact of the biodiverse mixtures introduced both in strips and in crop succession is monitored and evaluated.

### Level of practice adoption across the country:

1 2 3 4



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### Expectations regarding RURP

\*RURP : Reduction of Use and Risks of Pesticides

Enhancing biodiversity in the plots improves soil quality and global plant health. Expectations are :

- Soil fungi control
- Weed management without herbicides
- possibility to sell the farm products with the Zero Residues label



### Methods/strategy of application in the farm

The NA is applied through the use of cover crops sown in lines. The mixture is sown at a specific time of the year to take advantage of natural rainfall, as water availability is limited in the region. The cover crop is later cut and used as hay, while also contributing to soil coverage. This strategy helps reduce weed pressure and soil fungi incidence.

Due to the sandy soil and low precipitation, the method requires careful planning and continuous adjustment. The farmer must accept that results are slower and depend on long-term soil improvement rather than immediate effects.



### Key success factors

- Changes in work methods and farm workers mindset.
- Adjustment to the new practice (requires learning and adaptation).



### Improvements of the NA

In the future, the farmer plans to use a different mixture (still evaluating which option best fits the farm context) to make incorporation into the soil easier while maintaining the same benefits for soil health, weed management, and soil nutrition. The farmer will also try to select a mixture that is more resistant to water scarcity, due to the lack of water in the farm region. The only certainty at this point is that the future mixture will include mustard, because of its effective natural fungicidal properties.



Figure 01: Advisor presenting the NA



### Resources and skills needed to adopt the NA

- Willingness to invest financially, as there are no specific subsidies or support measures for this type of practice.
- Openness to change mindset, particularly moving away from conventional reliance on herbicides and fungicides.
- Basic technical knowledge of cover crops and their behavior in local soil and climate conditions.
- Capacity for observation, trial and error, and continuous adaptation of the cover crop mixture to local conditions.



### Advice from the Advisor

'Before choosing the mixture for strips and crop succession, the farmer should consider the overall context of the farm (such as climate, soil type, water availability, and the commercial crops in use) to select the mixture that best matches the farm conditions and the farmer's needs.



### Farmers Testimony

Before choosing the mixture for strips and crop succession, the farmer should consider the overall context of the farm (such as climate, soil type, water availability, and the commercial crops in use) to select the mixture that best matches the farm conditions and the farmer's needs.



### Social and Cultural Acceptance

The practice is generally acceptable but requires a mindset shift.  
Some farmers show initial resistance.



### Policies and Regulatory Support

Currently there is no specific public financial support.



## BENEFITS

Reduction of the use of fungicides and herbicides. Currently, the farmer does not apply fungicides because the mustard plant included in the strip and rotation mixture provides a natural fungicidal effect.



## BOUNDARIES

Difficulties in incorporating the plant mixture into the soil required three additional operations to achieve proper incorporation. This resulted in higher production costs, increased risk of soil compaction, and accelerated organic matter degradation.

### To go further on NA replication:

Conditions for implementation in other regions:  
Availability of water.  
Adaptation to local conditions (soil, climate, farming culture).

# Systemic Feasibility Analysis: Expert insights from Literature and Field Data

| CRITERIUM                     | INDICATOR                                     | INDICATOR SCORE                                                                                     | EVALUATION                                                                            |
|-------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Pesticide use reduction level | Reduction of the applied volume of pesticides | high reduction (>25%)<br><b>moderate reduction (10-25%)</b><br>low reduction (<10%)<br>no reduction |    |
| Soil quality                  | Impact on soil infiltration                   | -- / - / 0 / + / ++                                                                                 |    |
|                               | Impact on soil erosion                        | -- / - / 0 / + / ++                                                                                 |    |
|                               | Impact on soil organic matter                 | -- / - / 0 / + / ++                                                                                 |    |
| Biodiversity                  | Impact on bees                                | -- / - / 0 / + / ++                                                                                 |    |
|                               | Impact on arthropods other than bees          | -- / - / 0 / + / ++                                                                                 |    |
|                               | Impact on earthworms                          | -- / - / 0 / + / ++                                                                                 |    |
|                               | Impact on non-target soil micro-organisms     | -- / - / 0 / + / ++                                                                                 |    |
| Air quality                   | Impact on pesticide emissions                 | -- / - / 0 / + / ++                                                                                 |    |
| Working conditions            | Knowledge requirements                        | high training level<br>moderate training level<br>low training level<br>no training                 |    |
|                               | Impact on working-time                        | -- / - / 0 / + / ++                                                                                 |   |
|                               | Impact on work peaks                          | -- / - / 0 / + / ++                                                                                 |  |
|                               | Risk mitigation on operator/employee exposure | high mitigation<br><b>moderate mitigation</b><br>low mitigation<br>no mitigation                    |  |
|                               |                                               |                                                                                                     |                                                                                       |
| Costs                         | Required level of investment                  | > EUR 100.000<br>EUR 50.000 - 100.000<br>EUR 10.000 - 50.000<br><b>&lt; EUR 10.000</b>              |  |
| Outputs                       | Impact on yields (produced volumes)           | -- / - / 0 / + / ++                                                                                 |  |

## Impact Highlights

Based on the systemic feasibility analysis, the novel approach of implementing tailored biodiverse mixtures in strips and rotations presents significant strengths. The primary advantages are the consistently positive environmental impacts, including improved soil health and enhanced biodiversity among bees, arthropods, and microorganisms, with only moderate data variability. Furthermore, this approach requires a small investment and does not increase work time.

However, the main weakness is the high level of training required, though advisory support is accessible. Additionally, the approach achieves only a moderate reduction in pesticide usage, ranging from 10-25%.

Despite this, the approach represents a powerful, low-cost foundational strategy to build farm resilience and a healthier agroecosystem.

## Evaluation:

  
Not Satisfying

  
Not Satisfying

  
Moderately Satisfying

  
Satisfying

  
Very Satisfying

Find out more details:

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