



# How I implement IPM

Details of a holistic IPM strategy with low pesticide input in a European farm



**Simone Bensi**  
*Podere il Picchio,  
località Spicchiaiola,  
Volterra (Toscana)*



## My farm

### PEDO-CLIMATIC CONTEXT

- Mediterranean climate
- Clay loam stony soils
- Hilly area, no flat fields

### MAIN PESTS

- Weeds (Italian ryegrass, *Brassicaceae*, *Phalaris spp.*, others)
- Cereals fungi diseases (Rusts, Septoria, Take-all disease, others)

### AGRONOMICAL CONTEXT

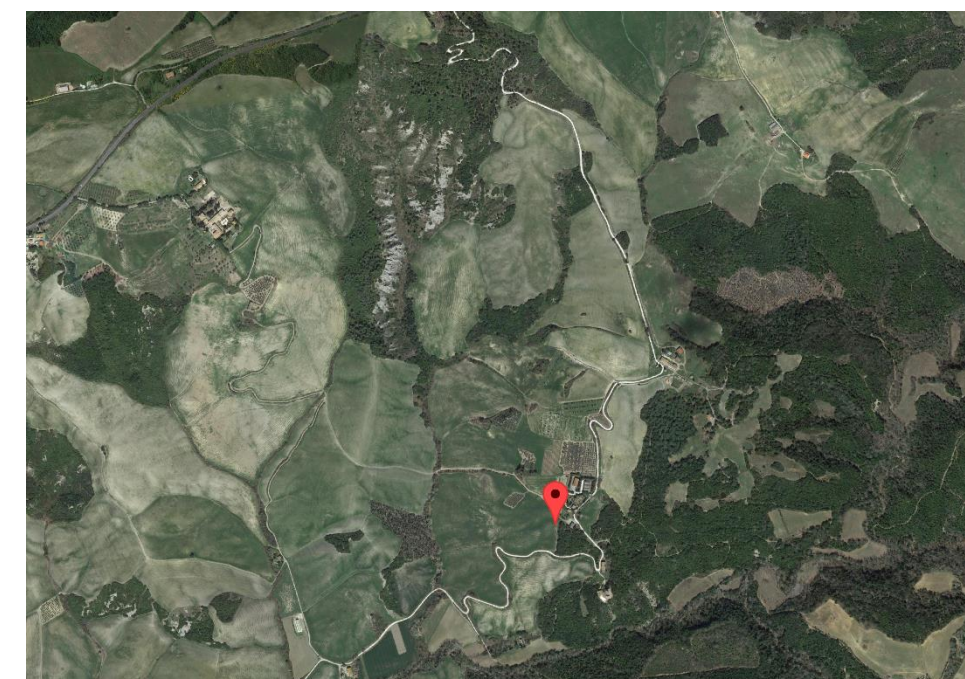
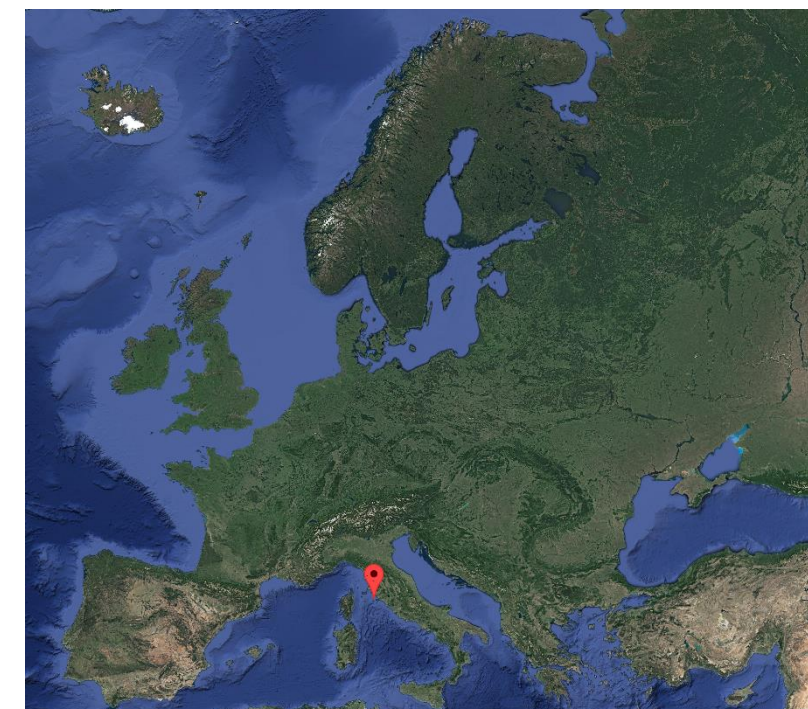
- 300 ha in a hilly area including 700 olive trees and 0.4 ha of vineyard and forest
- Limited crop rotations (cereals, forage crops, pulses)
- No or very rarely grown warm-season crops

### SOCIO-ENVIRONMENTAL CONTEXT

- Multifunctionality: agritourism (hospitality), high quality organic oil and grapevine production in addition to arable crops
- Certified organic farm for all production
- Three family members make up the workforce plus contractors for olives and grapevine

### OBJECTIVES AND MOTIVATIONS OF THE FARMER

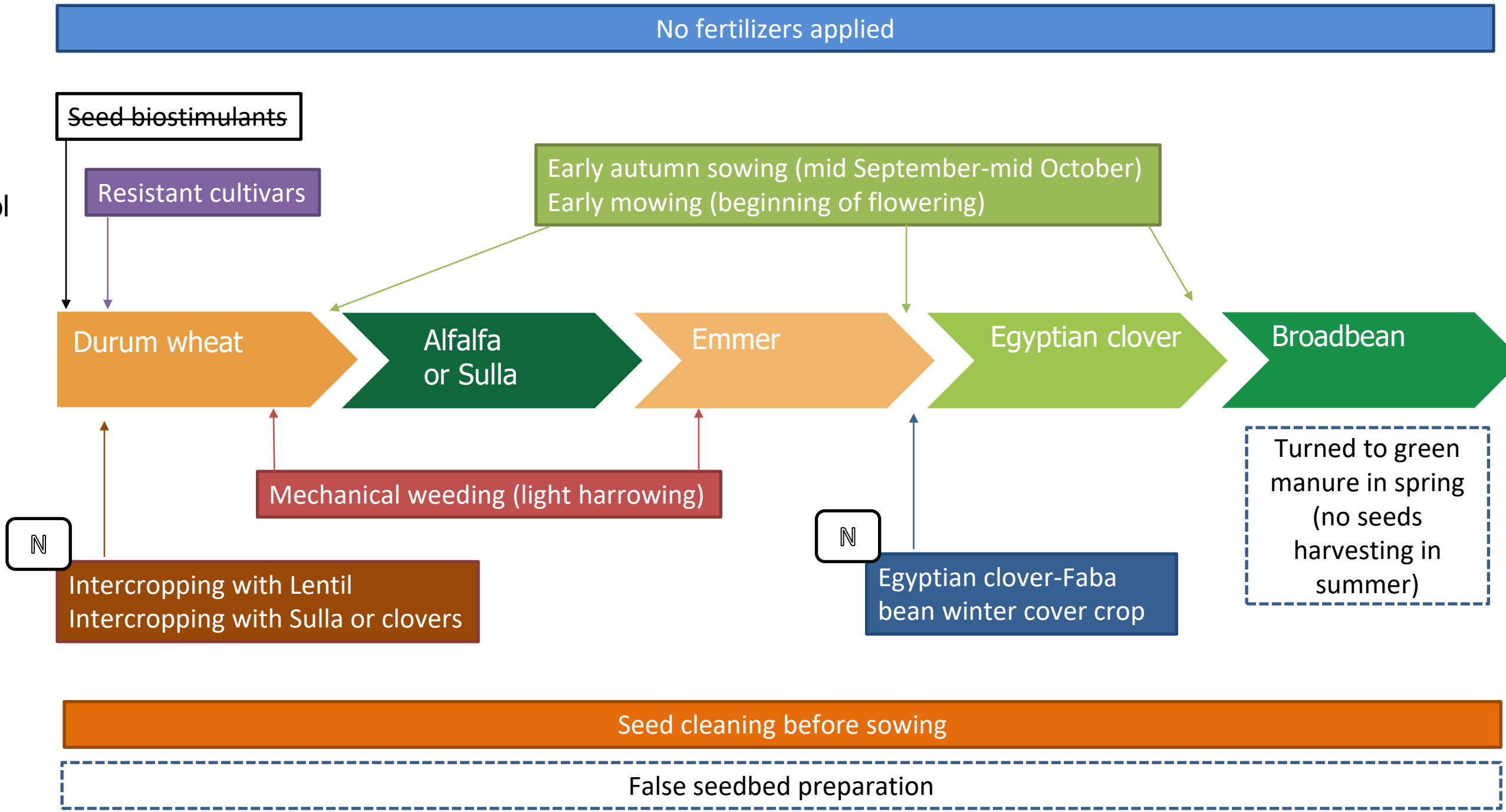
Improve the agronomic management to make profitable pesticide-free arable crops. Try new techniques to find the suitable ones to be implemented in a challenging pedo-climatic context thus adapting to a changing climate (rains are very concentrated, long periods of drought, late frost damages). Implement trials on intercropping with durum wheat and lentil (contemporary or relay seeding) and on durum wheat and legumes overseeding (sulla - *Hedysarum coronarium*). Having a double crop to improve weed control and improve the N cycle and soil fertility



# My strategy

## Alternative solutions

- Agronomical
- Genetics
- Physical control



## Chemicals and biocontrol

Insecticides and other pesticides\* Fungicides\* Herbicides\* \*In green = low risk PPPs \* In blue = biocontrol agents

Legend N New solution      ~~Solution~~ Abandoned solution        Non systematic solution

## Key measures

No pesticide used and lower yields and fungal diseases are accepted.

Important preventive methods to reduce weeds pressure include no fertilizers being applied and seeds are cleaned before sowing. Mechanical weeding is performed on cereals and early mowing for legumes is preferred.

New techniques implemented are the use of winter cover crops and intercropping on durum wheat. Contemporary seeding (lower machinery optimization) or relay seeding in early spring (more sensitive to drought) can be used.

Intercropping is used to produce two cash crops harvested together in the same field during a post-harvest separation (lentil) or to have a living mulch covering the soil after the winter cereal harvesting in summer with the objective of establishing a forage crop one year in advance (clovers, sulla).





# My results

Comparison with standards

## Pests control

| <u>Very good</u>        | <u>Medium</u>            | <u>To improve</u> |
|-------------------------|--------------------------|-------------------|
| Insects (no main pests) | Cereal diseases<br>Weeds |                   |

## Evolution of use of pesticides

| <u>Very good</u>                           | <u>Medium</u> | <u>To improve</u> |
|--|---------------|-------------------|
| No use of any chemical in the arable crops |               |                   |

## Sustainability indicators

| <u>Very good</u>   | <u>Medium</u>   | <u>To improve</u>  |
|--|---|--|
| <ul style="list-style-type: none"> <li>↘ - No use of pesticides</li> <li>↘ - Reduced weed pressure</li> <li>= - Tolerance of cereal diseases (no intervention)</li> <li>↗ - Satisfaction for safety for the workforce</li> <li>- Highly reduced environmental pollution and nutrient leakage</li> <li>↘ - Pesticide costs completely cut</li> <li>↘ - Fertiliser costs completely cut</li> <li>↗ - Increase in market prices through certified organic</li> <li>↗ - Chances for CAP payments for organic farming practices, intercropping and other practices</li> </ul> | <ul style="list-style-type: none"> <li>= - Yield stability</li> <li>↗ - High tillage frequency</li> <li>↗ - Soil erosion</li> <li>↘ - Crop rotation diversification</li> <li>↗ - Fuel costs and use</li> <li>= - Residues management</li> </ul> | <ul style="list-style-type: none"> <li>↘ - Deep tillage operation</li> <li>↘ - Soil fertility</li> <li>↗ - Crop establishment (re-seeding costs)</li> <li>= - Landscape diversification (erosion control and biological control)</li> <li>↗ - Distribution of workload (weather window)</li> <li>= - More perennial crops over annual</li> </ul> |

## Key conclusions

### The way to organic farming:

- The combination of no fertilization and high soil tillage frequency and depth can deplete the soil fertility in the long term, it is important to find a good amendment or organic fertilizer
- The transition to lower tillage operations can improve fertility and reduce the workload
- The crop species are diversified but the rotation is limited to winter cereals and legumes
- Intercropping techniques, cover crops and better residue management can be crucial factors and can give multiple benefits (cope with summer drought, improve soil fertility, reduce weed pressure, provide a double revenue)
- Landscape diversification (trees, field margins, agroforestry) can help soil fertility and erosion reduction

**Legend**  
 In green = positive trend  
 In red = negative trend  
 In black = comparable  
 = Comparable  
 ↗ Increase  
 ↘ Decrease  
 ↗ Significant increase  
 ↘ Significant decrease  
 Environmental indicators  
 Social indicators  
 Economical indicators



# Our feedback



“ Since I turned organic, I do not spray anymore: I feel safer, I do not notice a drop in yields, I cut many costs, I reduce the weed pressure and the cereals fungi diseases are tolerable in my opinion. I was already interested in intercropping and cover crops and I was happy to get involved with IPMWORKS to conduct field trials on my farm to improve my results, even if I was trying to work on it already by myself. I am satisfied with my weed management even if it increases my workload (mechanical weeding, seed cleaning, frequent mowing). I feel the need to go through robotization and automation since my farm is big and my workforce is limited. I feel the pressure to adapt to a changing climate and to very narrow weather window, so I prefer to turn to early autumn sowing for cereals and forage crops.

**Farmer: Simone BENSI (Italy)**

## MAIN OBJECTIVE OF THE FARMER

Reduce weed pressure and improve N soil content. Cope with summer drought and have the soil covered. Intercropping can help. Intercropping could be a good compromise to produce lentil which has a good price and it is not easy to be grown as a sole crop (difficult harvesting and weed control)

## ADVANTAGES OF THE SYSTEM

The cost of intercropping is related to the seed cost of the companion crop and the sowing operation cost. Some costs can be saved in the crop management and there are specific CAP payments. Growing two cash crops in the same season. The intercropping technique is better tailored on organic or low-input farms. Intercropped durum wheat does not suffer yield loss in general.

## LIMITS

The post harvest lentil and durum wheat separation is not easy and results in higher workload. The lentil relay seeding is more precise but it is prone to summer drought. The contemporary seeding is better for water requirements but the machineries are not optimized for seeding two crops in alternate rows.



“ This farm is a very good example of commitment to new trials to improve year by year and to adapt to the changing climate. Mechanical weeding and seed cleaning on cereals is very helpful even if it increases the workload. The choice of cutting fertilisers helps very much in reducing the weed pressure but can affect yield stability and crop establishment. Intercropping can give an additional revenue and/or anticipate the legume establishment and help with the nitrogen cycle. Some techniques are season-dependent and have to be carefully planned to decide if to use them or not or what to change. Residue management, cover crops, perennial legumes, soil amendments application and landscape diversification are all elements to be considered for holistic IPM and improved soil fertility

**Hub coach: Giovanni PECCHIONI (Italy)**

## Opportunities to develop in the future

- Try some warm season cover crops or a suitable cash crop to improve weed control and soil fertility
- Find a suitable amendment (cheap, easy to spread) to improve soil organic matter
- Flower strips (Echo-scheme 5)
- Agroforestry (insert tree rows, improve/replenish field margins)
- Robotization for mechanical weeding

