



# **Policy tools helping farmers in transition to agroecology (maize)**

**LORENZO FURLAN**

**lorenzo.furlan@venetoagricoltura.org**

# **HOW CAN AGRICULTURE THREATEN BIODIVERSITY?**



# **TWO MAIN CAUSES**

## **1) USE OF PESTICIDES (MAINLY INSECTICIDES)**

**1.1 At sowing: soil insecticides**

**1.2 Pre-flowering: foliar treatments**

**1.3 Post-flowering: foliar treatments**

## **2) REDUCTION OR MODIFICATION OF SUITABLE HABITATS**



# **1) USE OF PESTICIDES (MAINLY INSECTICIDES)**

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# **SOLUTIONS FOR AVOIDING OR REDUCING THE IMPACT OF THESE MECHANISMS (REDUCED PROBABILITY OF INSECTICIDE-BEE CONTACT)**

- 1) AVOID ALL USE;**
- 2) ADOPT PRECISION FARMING TECHNOLOGY TO REDUCE NO. OF  
TREATED AREAS, OFF-TARGET APPLICATIONS, AND DOSAGE**
- 3) REDUCE NO. OF TREATED FIELDS, INSPECT FOR CROPS EXCEEDING  
DAMAGE THRESHOLDS;**
- 4) IMPLEMENT ALTERNATIVES TO CHEMICAL INSECTICIDES, OR  
INSPECTIONS/STRATEGIES WITH NO OR MILD SIDE EFFECTS  
(e.g. entomopathogens, biocidal plants, nematodes,  
naturally derived insecticides).**



**PUT SIMPLY: THIS IS IPM**



**SOLUTION:**

**IPM +**

**RISK ASSESSMENT+**

**INSURANCE COVER**



# SOIL INSECTICIDE CASE STUDY





# IPM



# WIREWORMS

**TOOLS FOR EFFECTIVE IPM ARE AVAILABLE!**

- A) RISK FACTORS**
- B) PHEROMONE TRAPS**
- C) BAIT TRAPS**
- D) AGRONOMIC STRATEGIES**
- E) BIOCIDAL PLANTS AND MEALS**
- F) OTHER BIOLOGICAL TREATMENTS**

PLANTING CROPS WHERE  
AND WHEN THERE IS NO  
SERIOUS RISK OF  
ECONOMIC DAMAGE

THE FIRST AND MOST  
POWERFUL ALTERNATIVE  
TO INSECTICIDE USE



# **RISK ASSESSMENT**



# WHAT IS THE REAL SOIL PEST RISK FOR MAIZE?

A 30-YEAR DATASET FROM NORTH-EAST ITALY THAT INCLUDED 16% OF LAND WITH THE MAIN RISK FACTORS DEMONSTRATES THAT A RISK OF YIELD REDUCTION OCCURS IN LESS THAN 4% OF CULTIVATED LAND.

Confirmation in other Italian regions and Europe.

See: <http://www.reterurale.it/apenet> and

<http://www.pure-ipm.eu/project>, plus the following paper:

Furlan L, Vasileiadis VP, Chiarini F, Huiting H, Leskovšek R, Razinger J, Holbe JI, Sartori E, Urek G, Verschweleg A, Benvegnù I, Sattin M. (2017) Risk assessment of soil-pest damage to grain maize in Europe within the framework of Integrated Pest Management. *Crop Protection*, 97: 52-59, doi.org/10.1016/j.cropro.2016.11.029

# INSURANCE COVER



# PRACTICAL IMPLEMENTATION



CONDIFESA  
VENETO



CONDIFESA FVG

**AGRIFONDO  
MUTUALISTICO**

Veneto e Friuli Venezia Giulia  
(PRIVATE ASSOCIATION OF FARMERS)



REGULATION (UE) N. 1305/2013



**MAIZE  
MUTUAL FUND  
SINCE 2014**



Un fondo per danni da siccità, eccesso di pioggia, elateridi, diabrotica, malattie fungine.



# MUTUAL FUND

Funds managed **by farmers collectives** to provide compensation and balance risk by distributing risks inter-regionally.

**No profit**, vehicle of innovation with transparency rules



Compensation commensurate with the financial resources of the Fund  
Fund stock increased by savings in forecast costs

Solutions that are not offered by the traditional insurance market



<b>RISKS COVERED</b>	<ul style="list-style-type: none"> <li>• Insufficient plant density (stand) due to adverse weather conditions (i.e. drought, flooding, freezing cold)</li> <li>• Insufficient plant density (stand) due to soil pests (e.g. wireworms, black cutworms), or diseases, such as Fusarium spp. (rotten roots, seedlings)</li> <li>• Diabrotica (WCR) damage</li> <li>• loss of production caused by wild fauna</li> </ul>
<b>TARGET</b>	Members of farmer consortia
<b>OBLIGATIONS</b>	<ul style="list-style-type: none"> <li>• Contract to be signed within 7 days after sowing;</li> <li>• Implementation of good cultivation practices;</li> <li>• Implementation of Directive 128/2009/EC;</li> <li>• <u>Connection and implementation of suggestions in “Annual Crops Bulletin”</u></li> </ul>
<b>COSTS</b>	€ 3-5/ha all inclusive (including flooding, excessive rain, freezing cold, drought, pest risk)
<b>COMPENSATION</b>	<p>Up to € 500/ha including:</p> <ul style="list-style-type: none"> <li>• Resowing (up to € 250/ha) if stand below 4 pls/m<sup>2</sup></li> <li>• Yield reduction (up to € 250/ha) based on sowing delay, crop change</li> <li>• up to € 1000/ha for WCR damage</li> </ul>





**INSURANCE COVER WITH MUTUAL FUNDS CAN BOTH IMMEDIATELY REDUCE PESTICIDE USE AND INCREASE FARMERS' NET INCOME, AS THEY:**

**1) REPLACE PESTICIDES WITH LOW DAMAGE RISK**

**2) INCREASE IPM APPLICATION, MAKING FARMERS COMFORTABLE WITH IPM IMPLEMENTATION**



# ADVANTAGES OF MUTUAL FUNDS

1. Reduces costs/ha;
2. Covers risks due to mistakes or difficulties in IPM implementation (e.g. delay in black cutworm treatments);
3. Covers other risks, e.g. flooding and drought, not covered by insecticides;
4. Reduces health risk for farmers, as there is no contact with insecticides;
5. No negative impact of insecticides on soil beneficials;
6. No pollution risks for soil and water tables;



# ADVANTAGES OF MUTUAL FUNDS

7. No risk to bees and other wild pollinators; more generally, reduces risk to fauna;
8. Covers weather risks, including weather causing soil insecticides to fail (Furlan *et al.* 2011, Ferro and Furlan, 2012, Furlan *et al.* 2014).

Furlan L., Benevegnu' I, Cecchin A., Chiarini F., Fracasso F., Sartori A., Manfredi V, Frigimelica G., Davanzo M., Canzi S., Sartori E., Codato F., Bin O., Nadal V., Giacomel D, Contiero B (2014) *Difesa integrata del mais: come applicarla in campo*. L'Informatore Agrario, 9, Supplemento Difesa delle Colture, 11-14.

Furlan L., Cappellari C., Porrini C., Radeghieri P., Ferrari R., Pozzati M., Davanzo M., Canzi S., Saladini M.A., Alma A., Balconi C., Stocco M. (2011) *Difesa integrata del mais: come effettuarla nelle prime fasi*. L'Informatore Agrario, 7, Supplemento Difesa delle Colture: 15 – 19.

Ferro G., Furlan L. (2012) *Mais: strategie a confronto per contenere gli elateridi*, 42, L'Informatore Agrario, 42, Supplemento Difesa delle Colture: 63 – 67.



# CONCRETE IMPLEMENTATION



# **RESULTS 2015-2021**



Year	Maize cultivated land covered by MF (Ha)	Maize cultivated land damaged by wireworms (Ha)	Maize cultivated land damaged by WCR (Ha)	Maize cultivated land damaged by wireworms+WCR (Ha)	Maize cultivated land damaged by wireworms+WCR (%)
<b>2015</b>	53,000	0	0	0	0.00
<b>2016</b>	42,116	80.2	0	80.2	0.19
<b>2017</b>	37,665	217.3		217.3	0.58
<b>2018</b>	42,118	133.1		133.1	0.32
<b>2019</b>	39,153	363.1		363.1	0.93
<b>2020</b>	41,573	32.7	91	123.7	0.30
<b>2021</b>	39,714	126.4	52.3	178.7	0.45
<b>Mean</b>	<b>42,191</b>			<b>156.6</b>	<b>0.39</b>



# **AVERAGE RESULTS 2014-2021**

**DETAILED STUDY OF A REPRESENTATIVE AREA (about 450 HA)  
INCLUDING RISK FACTOR FIELDS (5-7%) WITH a) UNTREATED  
MONITORED FIELDS, OR b) UNTREATED AND TREATED STRIPS  
WHERE SIGNIFICANT  
PEST POPULATIONS HAD BEEN FOUND**

**Hectares with economic damage by soil pests**

**2014: 0.56% - 2015: 0.00% - 2016: 0.38% - 2017: 0.11% - 2018: 0.10%  
2019: 0.00% 2020: 0.20% 2021: 0.90%**

**Value of yield reduction**

**2014: € 700/100 ha - 2015: € 0.00/100 ha - 2016: € 118/100 ha  
2017: € 167/100 ha - 2018: € 35/100ha 2019: € 0.00/100 ha  
2020: € 40/100 ha 2021: 90 €/100ha**

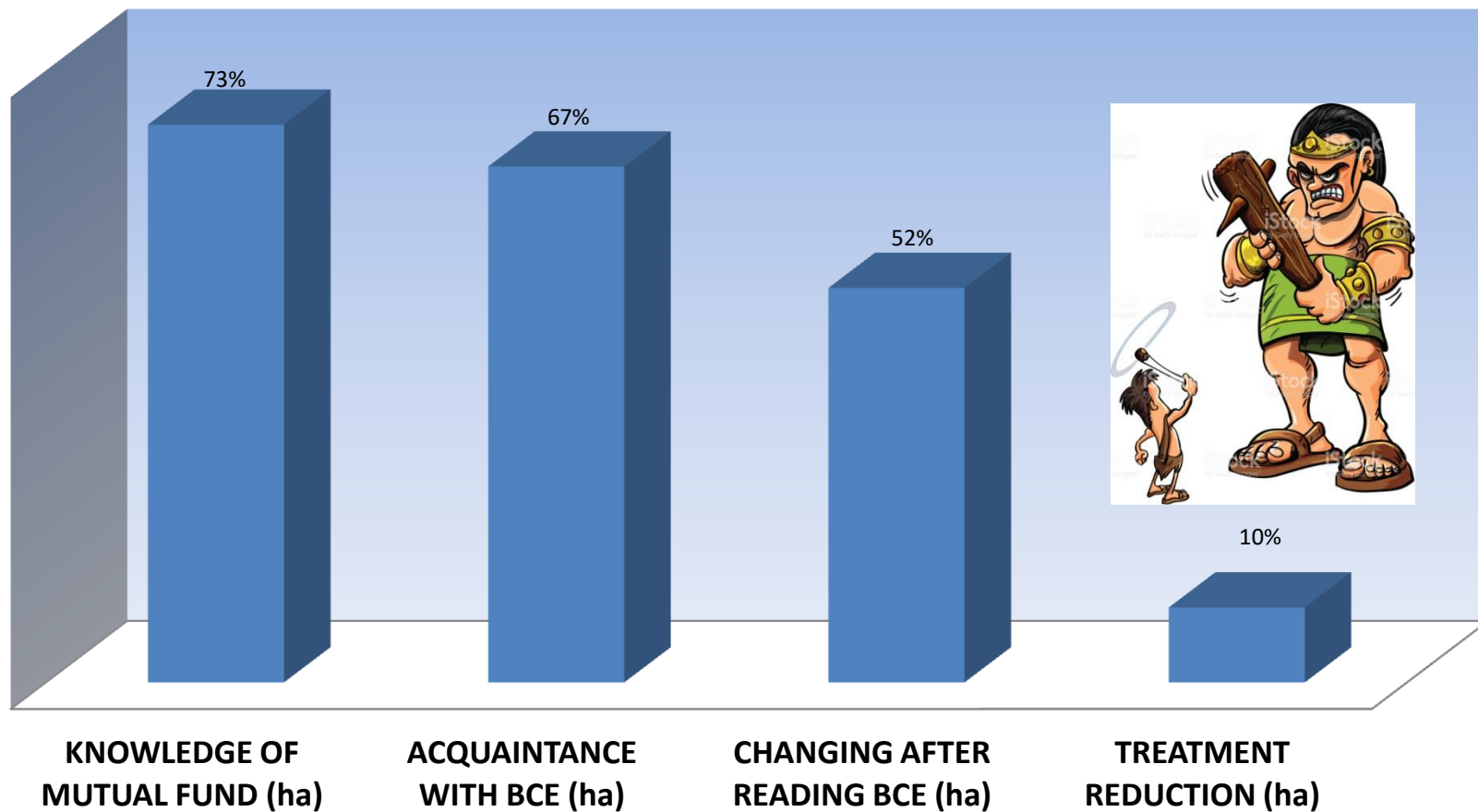
**Average value of yield reduction 2014/2021**

**€150/100 ha – €1,50/ha**



# MAIZE MUTUAL FUNDS EFFECT ASSESSMENT

Veneto Provinces PD-TV-VR  
Sample of 1655 ha of maize (126 farms)





# **SOME SUCCESSFUL CASE STUDIES**

## **Az. Moizzi, Italy: Results**

1. More than 1,900 hectares of maize untreated, i.e. no soil insecticide, (1984-2021);
1. 9/1900 ha (0.40%) with economic populations (solution: replace maize with other crops);
2. Seed/plant damage always below 5% (usually 0.1% to 2.5%);
1. No economic damage: 97% of fields with high stand ( $> 90\%$  of sown seeds). Some cases of stand reduction ( $< 5$  pp/m<sup>2</sup>), mainly due to bird damage;
1. More than €75,000 saved, no threat to worker health, and no environmental impact.



# VENETO AGRICOLTURA OPEN FARMS - OPEN PROTOCOLS

**2009 – 2021**

**No soil insecticides**

**600 ha land farmed for 13 years**

**180-190 ha maize for 13 years**

**> 2300 ha maize farmed over 13 years**

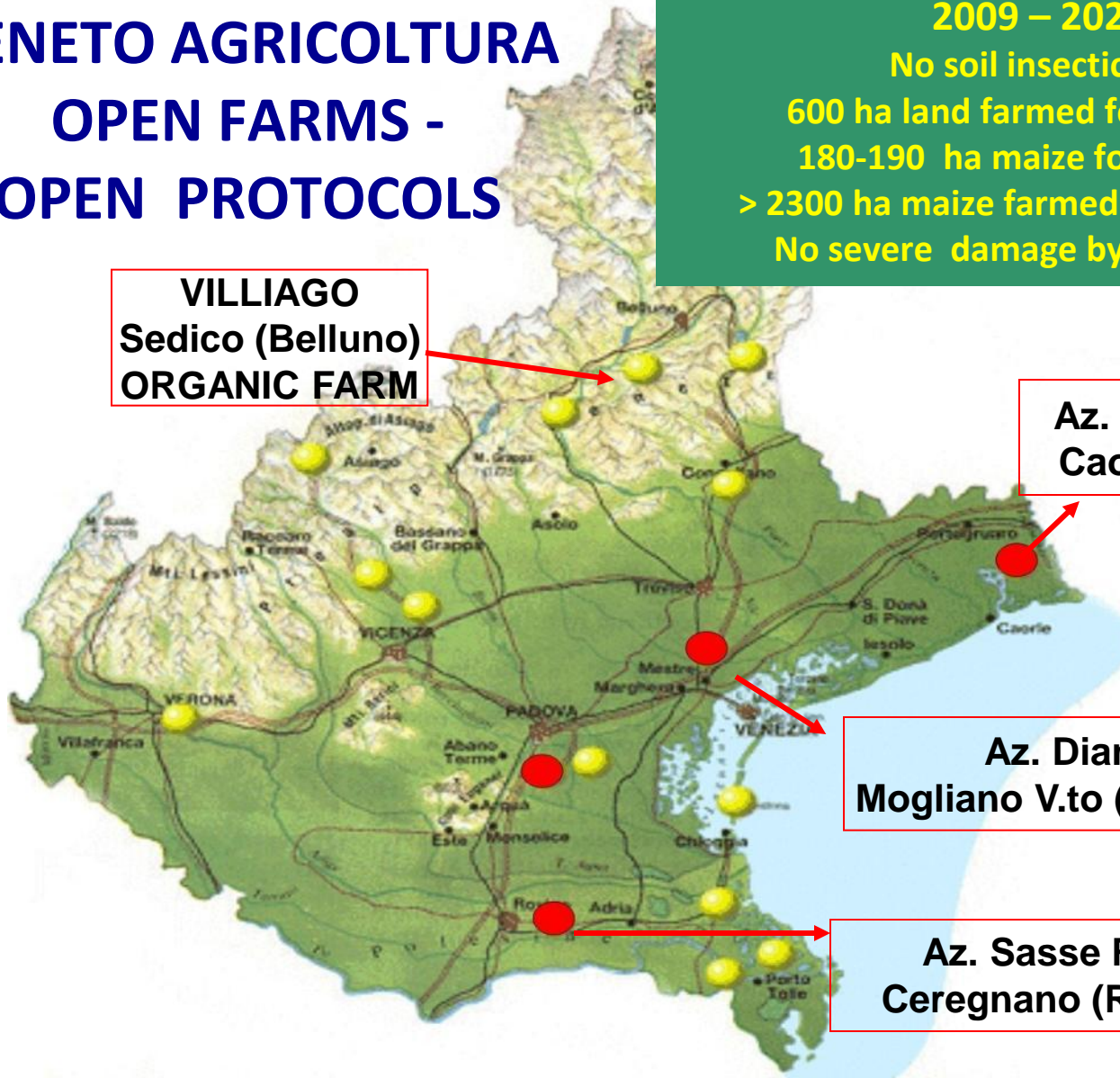
**No severe damage by soil insects**

**VILLIAGO  
Sedico (Belluno)  
ORGANIC FARM**

**Az. Vallevecchia  
Caorle (Venice)**

**Az. Diana  
Mogliano V.to (Treviso)**

**Az. Sasse Rami  
Ceregnano (Rovigo)**



# WHAT CAN GOVERNMENT INSTITUTIONS DO TO MAKE EFFECTIVE IPM IMPLEMENTATION?

- 1) SUPPORT RISK ASSESSMENT STUDIES FOR ALL THE CROPS TO IMPROVE IPM STRATEGIES AND COST EVALUATION FOR MUTUAL FUNDS
- 2) GIVE PRECISE TARGETS FOR IPM (e.g. maximum % of cultivated land that may be treated with soil insecticides in each MS or region)
- 3) GIVE FEASIBLE CONTRIBUTIONS TO MUTUAL FUNDS IN ORDER TO “TURN THE KEY” IMMEDIATELY
- 4) SUPPORT INDEPENDENT ADVISORY SYSTEM
- 5) SUPPORT APPLIED RESEARCH FOR PRACTICAL SOLUTIONS AND KNOWLEDGE TRANSFER – A DRAMATIC CHANGE IS IMMEDIATELY POSSIBLE – JUST A QUESTION OF WILLINGNESS



## **2) REDUCTION OR MODIFICATION OF SUITABLE HABITATS**

**NEW CAP (Common Agricultural  
Policy) 2023 – 2027?**

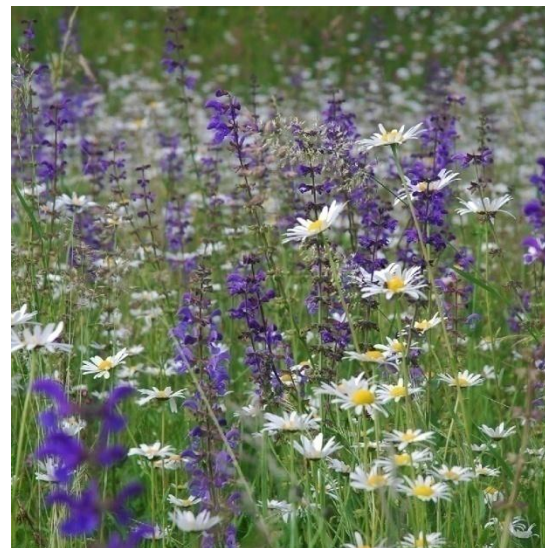


# COUNTER-MEASURES TO CONTRAST BIODIVERSITY LOSS





## OUTSIDE THE FARM - Landscape Biodiversity



## AT FIELD MARGINS - Increasing biodiversity around cultivated fields

field edges, ditches,  
headgerows, paths,

Agroforestry,.....

Giving complementary incomes





## INSIDE THE FIELDS - suitable main crops in rotation

**Canola, sunflower,  
alfaalfa, orchards,**

.....

**Potential for  
pollinators varies with  
cultivars**





## INSIDE THE FIELDS - SUITABLE COVER CROPS

***Phacelia tanacetifolia***  
**(annual), Trifolium spp.,**  
**Brassicaceae,.....**



# ANNUAL CROPS BULLETIN

[bollettino.erbacee@venetoagricoltura.org](mailto:bollettino.erbacee@venetoagricoltura.org)

<http://www.venetoagricoltura.org/argomento/bollettino-colture-erbacee/>

