



Policy tools helping farmers in transition to agroecology in maize production

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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 - REDUCTION OF BIODIVERSITY IN CULTIVATED FIELDS



1) USE OF PESTICIDES (MAINLY INSECTICIDES)

1.1 At sowing: soil insecticides

1.2 Pre-flowering: foliar treatments

1.3 Post-flowering: foliar treatments



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



**AGRIFONDO
MUTUALISTICO**

Veneto e Friuli Venezia Giulia
(PRIVATE ASSOCIATION OF FARMERS)



REGULATION (UE) N. 1305/2013



**MAIZE
MUTUAL FUND
SINCE 2014**

Agrifondo Mutualistico - Associazione Mutualistica dei Condifesa del Veneto e Friuli Venezia Giulia



CONDIFESATV

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



RISKS COVERED	<ul style="list-style-type: none"> • Insufficient plant density (stand) due to adverse weather conditions (i.e. drought, flooding, freezing cold) • Insufficient plant density (stand) due to soil pests (e.g. wireworms, black cutworms), or diseases, such as Fusarium spp. (rotten roots, seedlings) • Diabrotica (WCR) damage • loss of production caused by wild fauna
TARGET	Members of farmer consortia
OBLIGATIONS	<ul style="list-style-type: none"> • Contract to be signed within 7 days after sowing; • Implementation of good cultivation practices; • Implementation of Directive 128/2009/EC; • <u>Connection and implementation of suggestions in “Annual Crops Bulletin”</u>



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 (%)
2015	53,000	0	0	0	0.00
2016	42,116	80.2	0	80.2	0.19
2017	37,665	217.3		217.3	0.58
2018	42,118	133.1		133.1	0.32
2019	39,153	363.1		363.1	0.93
2020	41,573	32.7	91	123.7	0.30
2021	39,714	126.4	52.3	178.7	0.45
Mean	42,191			156.6	0.39



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**

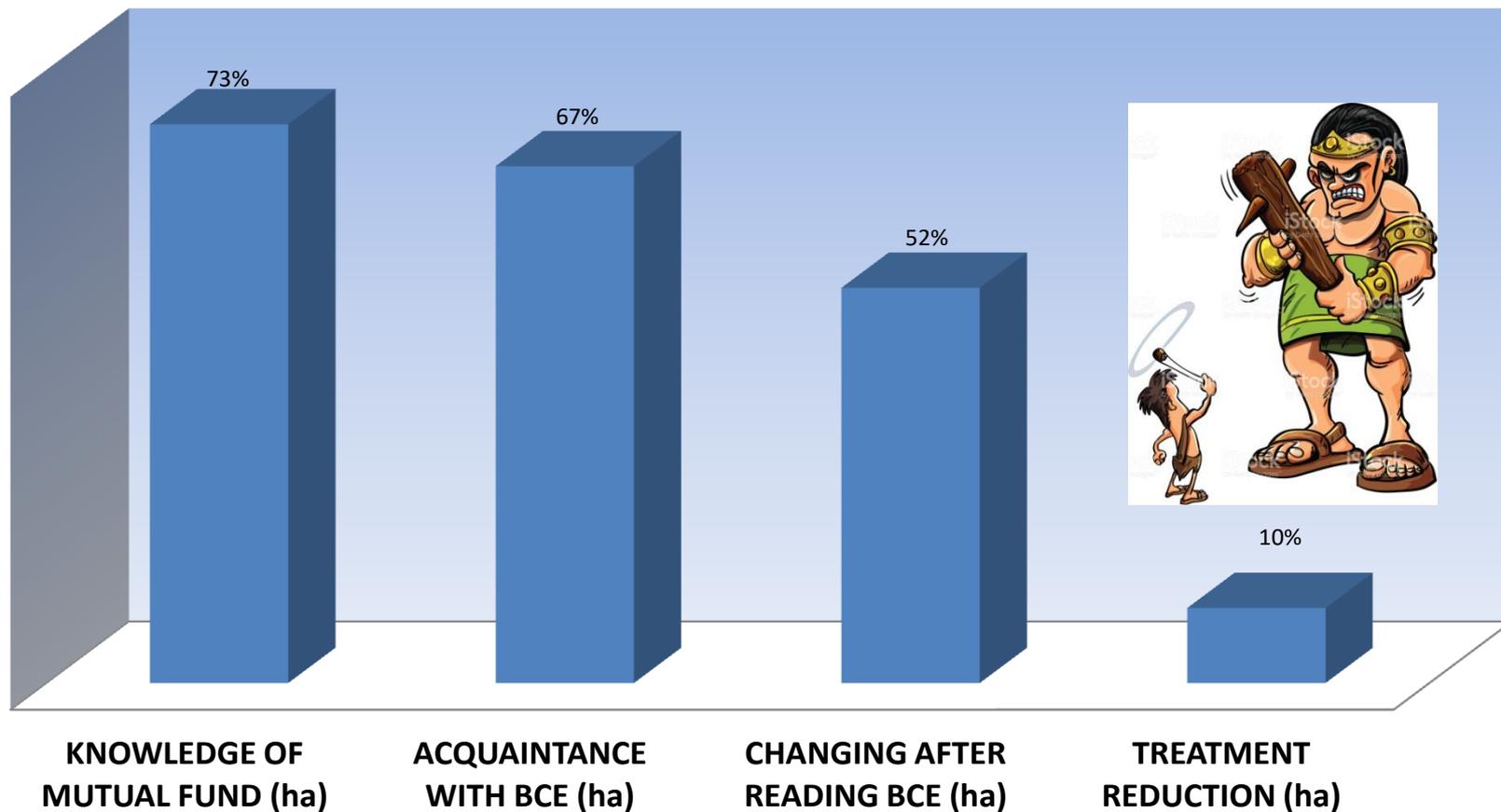
Average value of yield reduction 2014/2021

€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

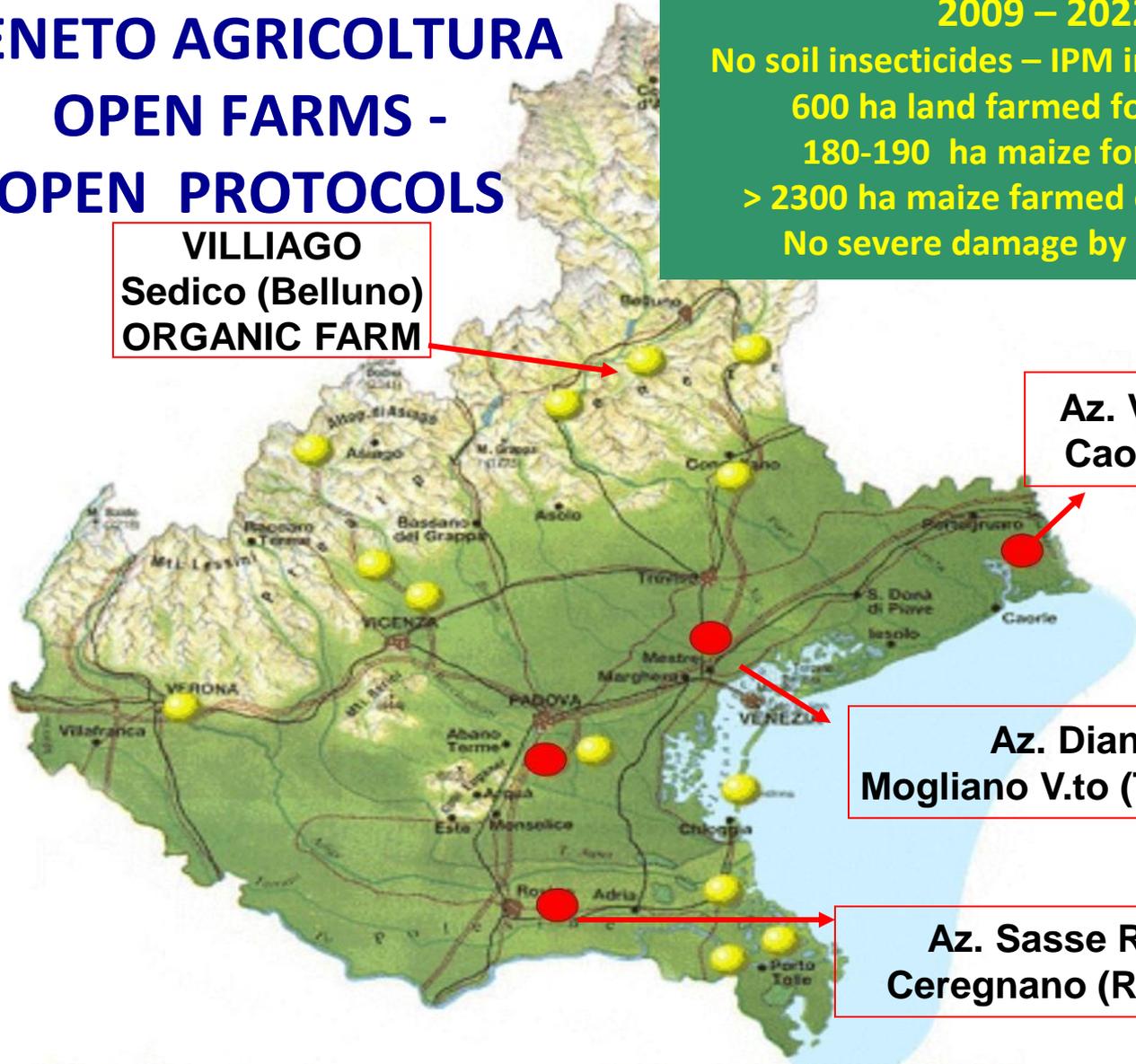
- 1. More than 1,900 hectares of maize untreated, i.e. no soil insecticide, (1984-2022);**
- 1. 9/1900 ha (0.40%) with economic populations (solution: replace maize with other crops);**
- 2. Seed/plant damage always below 5% (usually 0.1% to 2.5%);**
- 1. No economic damage: 97% of fields with high stand (> 90% of sown seeds). Some cases of stand reduction (< 5 pp/m²), 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

VILLIAGO
Sedico (Belluno)
ORGANIC FARM

2009 – 2022
No soil insecticides – IPM implementation
600 ha land farmed for 14 years
180-190 ha maize for 14 years
> 2300 ha maize farmed over 14 years
No severe damage by soil insects



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**



ANNUAL CROPS BULLETIN

bollettino.erbacee@venetoagricoltura.org

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

