



Assessment of alternative plant protection measures

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PestiRed



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Idea

- avoiding the use of plant protection products (PPPs) as far as possible
- consistent implementation and further development of integrated pest management

Quantitative objectives

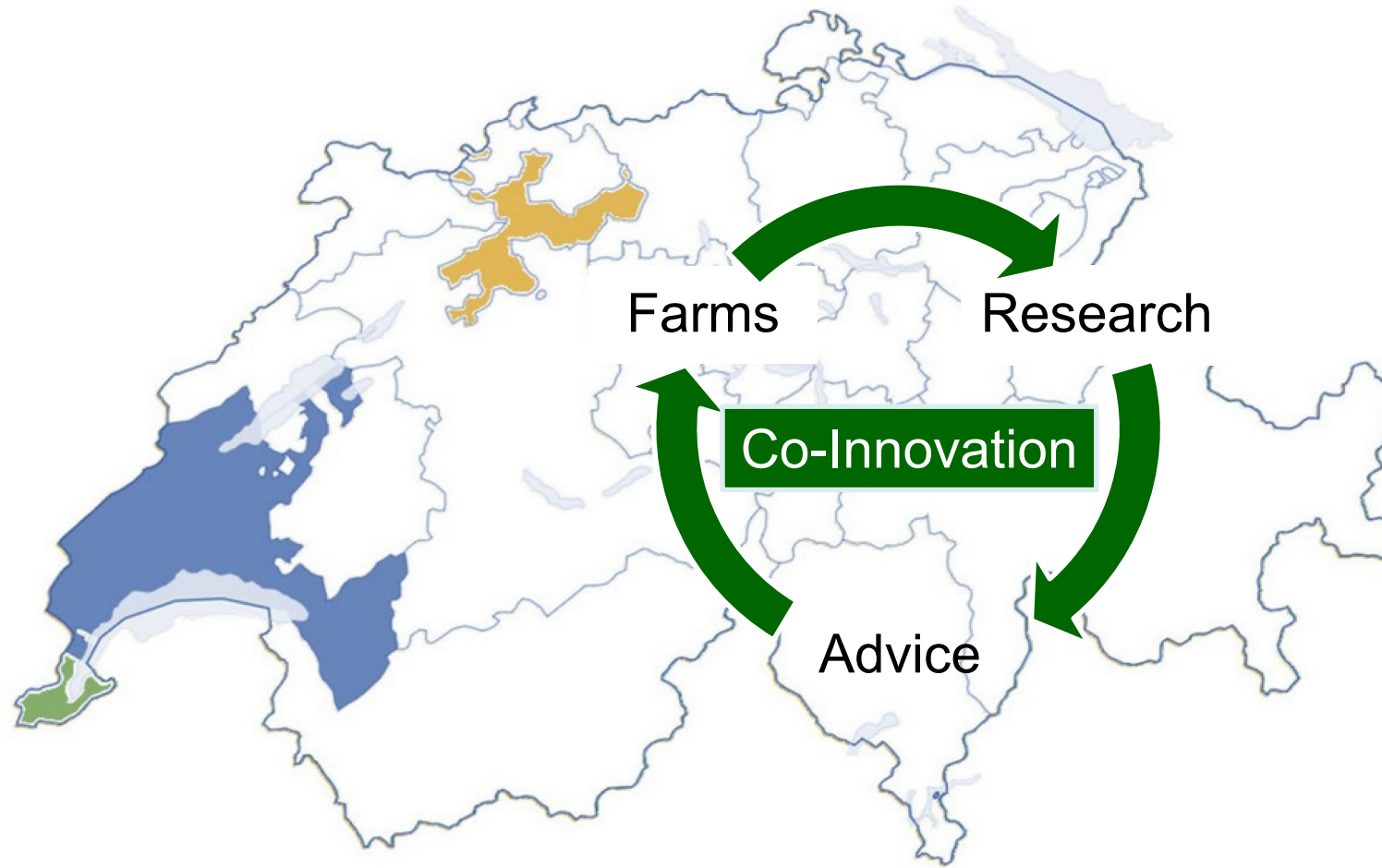
- reduction of chemical-synthetic PPPs by at least 75%
- profitability should be maintained as far as possible, max. 10% reduction

Project implementation

- 67 farms in three different cantons
- 6-year crop rotation & 2 years of accompanying research (duration 2019-2027)

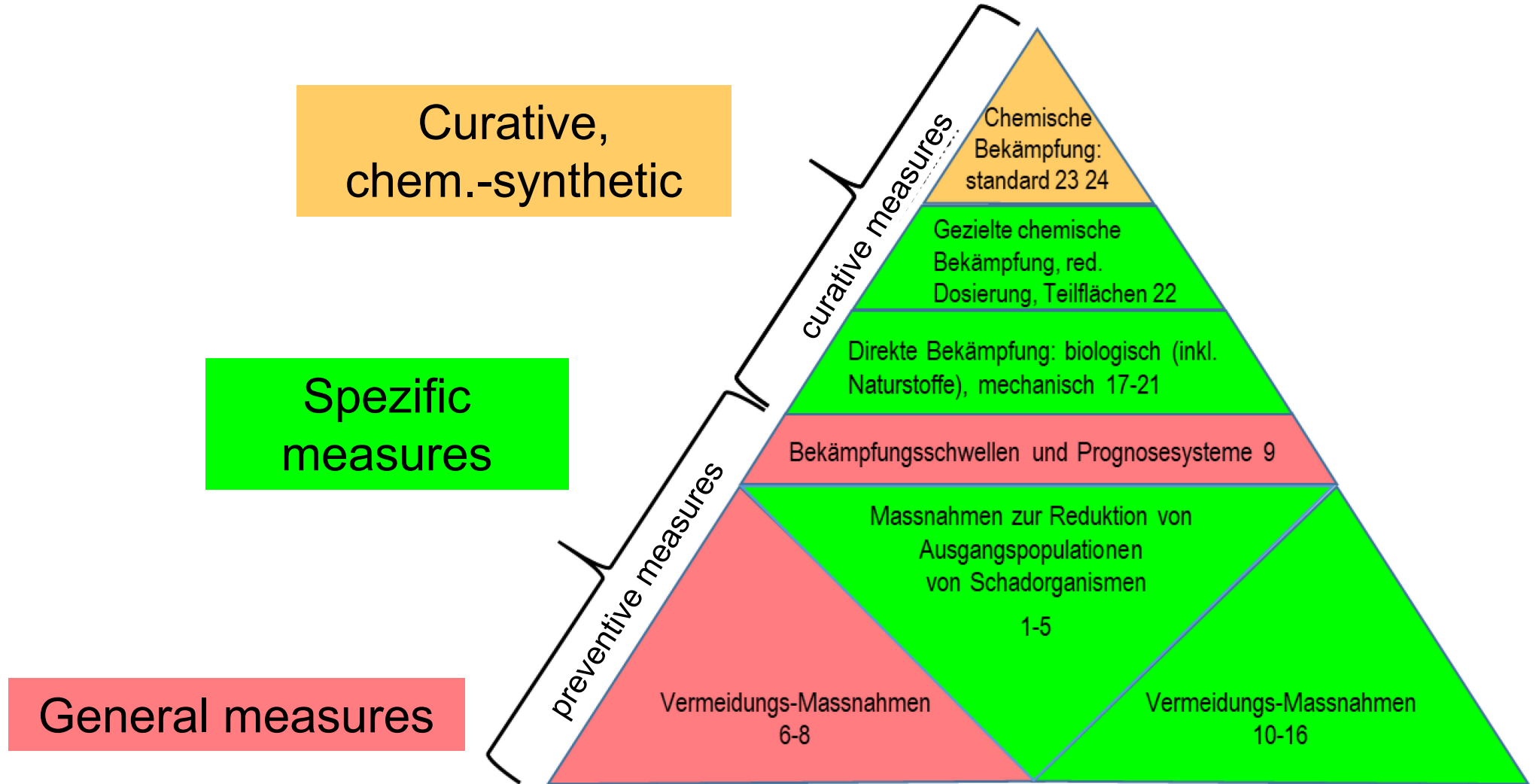


Co-innovative approach



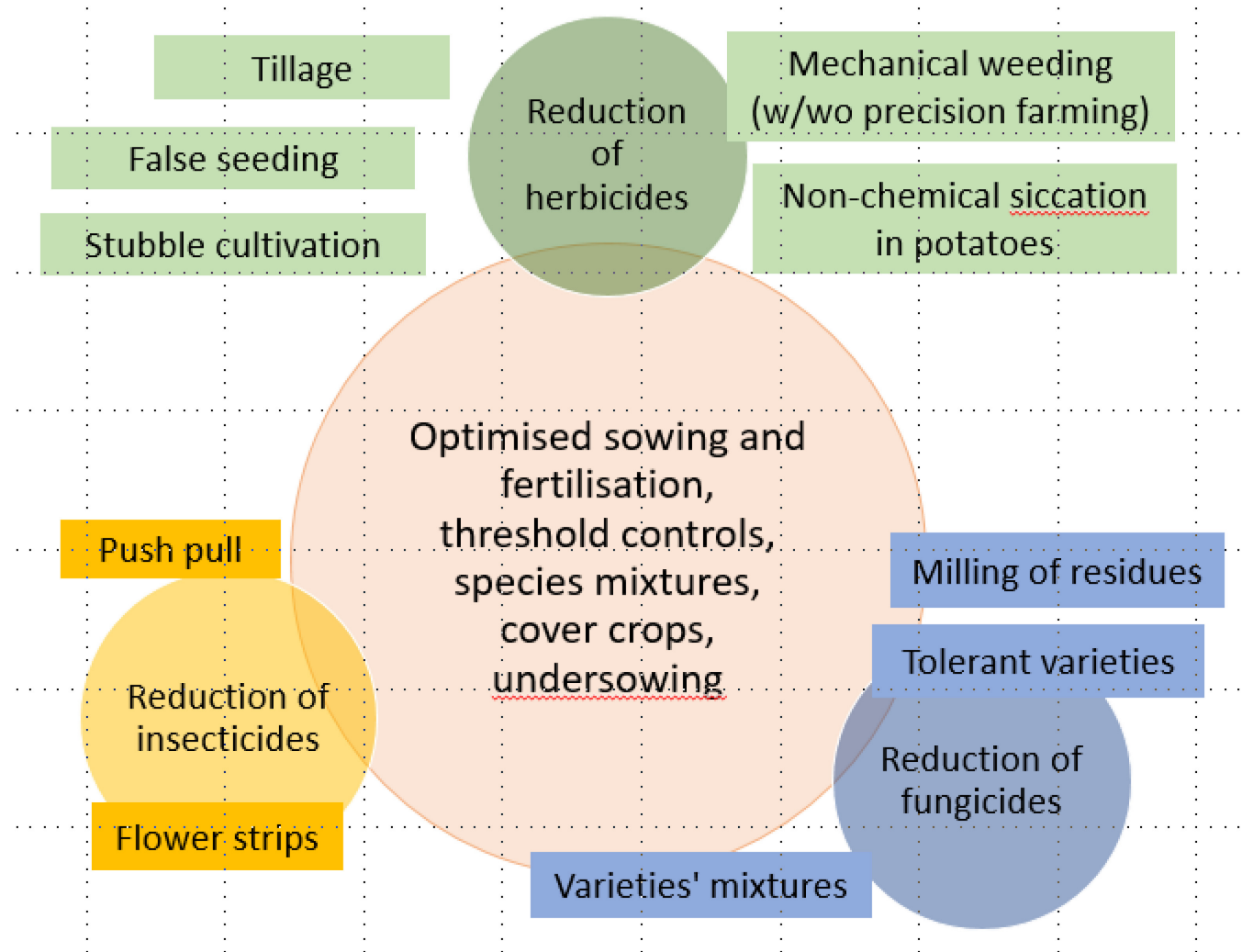


Pyramid of integrated pest management





Measures & impact area





Data collection



- Online survey of participating farms each autumn/winter
- All crops considered except artificial grassland

Crop	Harvest year		Total
	2020	2021	
Wheat	15	8	23
Colza	8	10	18
Maize	7	8	15
Barley	9	5	14
Pea	3	7	10
Spelt	3	3	6
Sugar beet	3	2	5
Sunflower	3	2	5
Potatoes	4	0	4
Soy	1	3	4
Legume mixture	0	4	4
Chickpea	0	1	1
Total	56	53	109



Assessment of measures – reduction of PPPs



Measure	Type	Area	Reduction PPP	N
Mechanical weed control using Precision farming		C	6,3	23
Mechanical weed control		C	5,8	66
Partial area treatment chemical		D	5,5	15
Tillage in reduced tillage systems		A	5,4	34
Control thresholds & forecasting systems	B	B	5,3	101
Varieties - less susceptible	B	B	5,3	105
Weed cures		A	5,2	45
Forecasting system PhytoPRE	B	B	5,1	10
Push-pull techniques Rape leaf beetle		B	5,0	9
Optimised catch cropping		B	5,0	34
Drift-reducing spraying techniques	B	D	5,0	98
Mechanical stubble cultivation		A	4,9	57
Sluxx (alternative PPP)		C	4,9	8
Trichogramma (alternative PPP)		C	4,9	8
Crushing of crop residues		A	4,8	830
Undersowing		B	4,7	40
Optimisation of sowing	B	B	4,7	104
Nitrogen - adapted use	B	B	4,5	103
Mixtures of varieties		B	4,5	23
Flowering strips		C	4,3	23

Type of measure:

G – General measure

Area of measure:

A – Reduction of initial harmful organisms

B – Preventive measure

C – Non-chemical control

D – Chemical control

How do you assess this measure with respect to...?							
Profitability	1	2	3	4	5	6	7
Reduction of PPP	very negative	negative	rather negative	neutral	rather positiv	positive	very positive



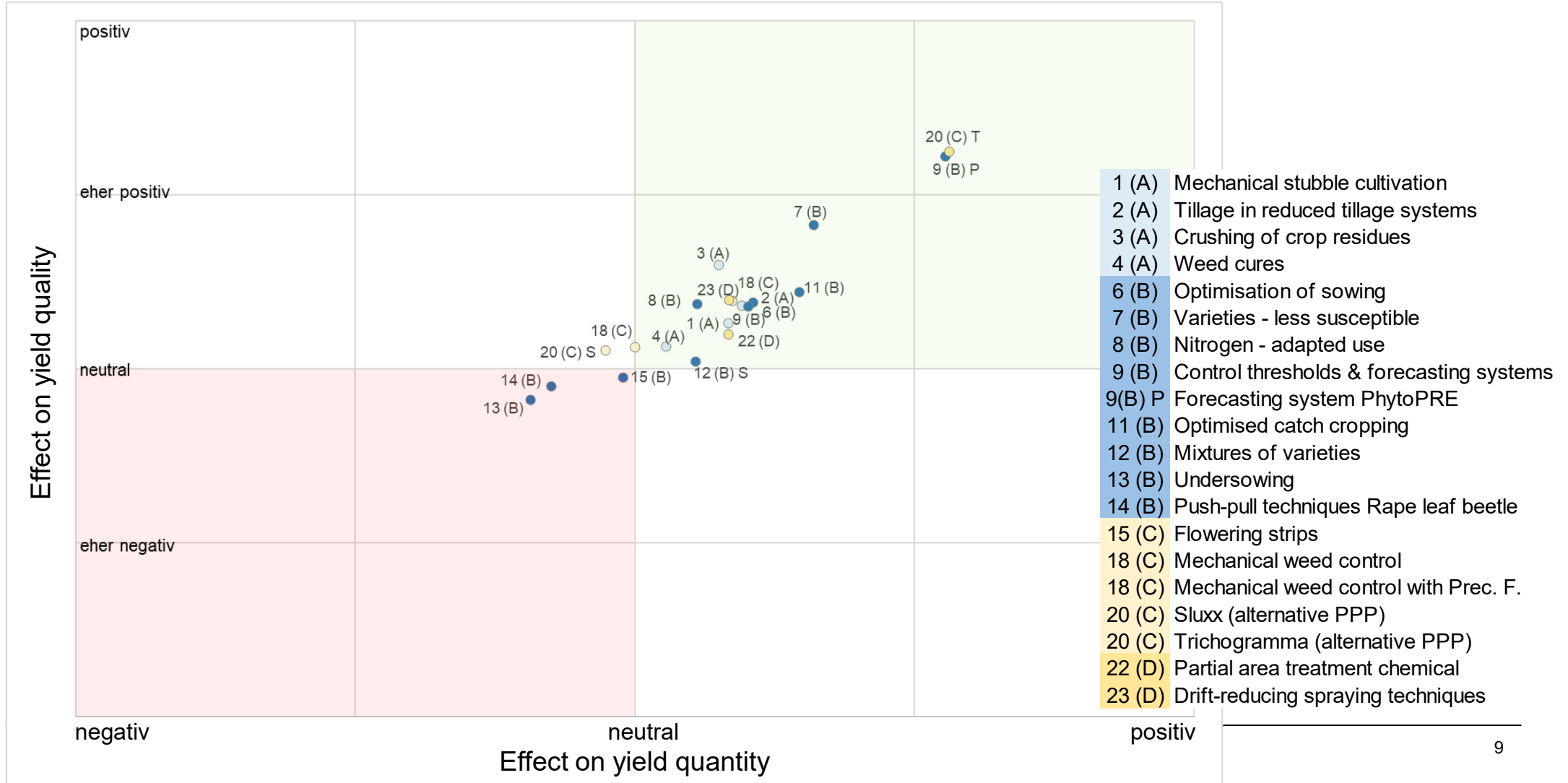
Assessment of measures – ... & profitability



Measure	Type	Area	Reduction PPP	Profitability	N
Mechanical weed control using Precision farming		C	6,3	4,5	23
Mechanical weed control		C	5,8	3,9	66/65
Partial area treatment chemical		D	5,5	4,2	15
Tillage in reduced tillage systems		A	5,4	4,6	34
Control thresholds & forecasting systems	B	B	5,3	4,9	101/100
Varieties - less susceptible	B	B	5,3	5,0	105
Weed cures		A	5,2	4,0	45/44
Forecasting system PhytoPRE	B	B	5,1	4,0	10
Push-pull techniques Rape leaf beetle		B	5,0	5,3	9
Optimised catch cropping		B	5,0	4,8	34
Drift-reducing spraying techniques	B	D	5,0	4,4	98/97
Mechanical stubble cultivation		A	4,9	4,4	57
SluXX (alternative PPP)		C	4,9	3,8	8
Trichogramma (alternative PPP)		C	4,9	5,0	8
Crushing of crop residues		A	4,8	4,1	30
Undersowing		B	4,7	3,9	40
Optimisation of sowing	B	B	4,7	4,6	104
Nitrogen - adapted use	B	B	4,5	4,6	103/104
Mixtures of varieties		B	4,5	4,0	23
Flowering strips		C	4,3	3,6	23



Farmers' assessment of measures wrt yield quantity & quality



Source: Analysis of farmer surveys, harvest years 2020 & 2021



Discussion



- **Data base of 2 years – preliminary results**
- **Measures are generally assessed positively or neutrally in terms of their potential to save PPPs**
 - Savings on herbicides seem easier attainable
- **Project contributions for specific measures seem to cover the costs**
- **Rather positive economic evaluations of (measures)**
 - Selection of resistant cultivars
 - Control thresholds and forecasting systems
 - Intercropping



Conclusions



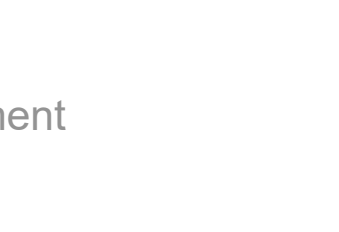
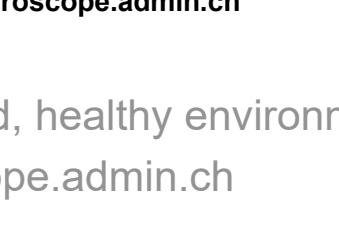
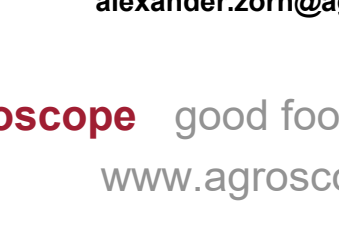
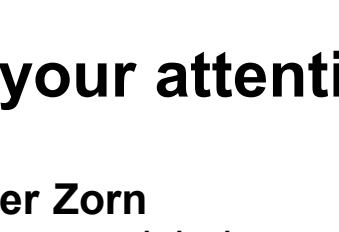
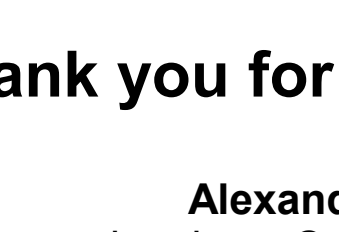
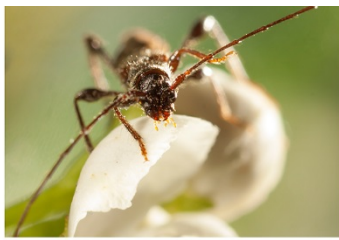
- **First survey results confirm the project's approach to work on a consistent implementation of the integrated pest management approach**
 - Potential of basic measures (variety selection, control thresholds & forecasting systems) reduce PPP use at low cost
- **All measure are considered to have the potential to reduce the use of PPPs**
 - Savings from herbicide seem to be better achieved than from insecticides and fungicides according to the survey
- **Profitability with project contributions mostly given**
 - this evaluation is supported by positive correlation of the evaluation of the measures' effect on yield quantity and quality



Many thanks

- **Farmers** for their willingness to cooperate and in particular for the given open exchange of experiences and data
- **regional advisors** for the constructive advice and exchange
- colleagues **PestiRed project team** and from **Agroscope** for the pretest of the questionnaire, especially **Maria Haller** and **Antonia Kaiser** as well as **Andrea Seiler, Anne-Valentin de Jong, Julie Buchmann**
- **Lara Meier** and **Solène Clémence**, who programmed the questionnaire at UNIPARK and checked, processed as well as analysed data from the field calendars





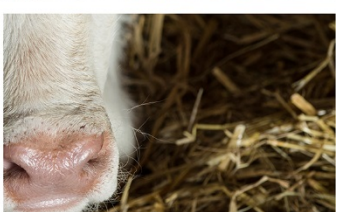
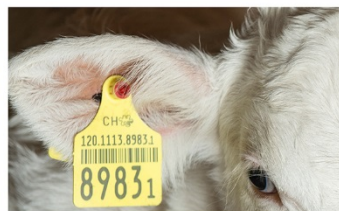
Thank you for your attention

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Bewertung der Massnahmen I

Wie beurteilen Sie den Aufwand bzw. die Kosten der Massnahme "Mechanische Unkrautbekämpfung (ohne Lenksystem oder Kamera)"?

Aufwand bzw. Kosten können sowohl Betriebsmittel-, Maschinen- und Arbeitskosten, als auch entgangene Leistungen (Mindererträge, Qualitätsabzüge) umfassen.

sehr gering	gering	eher gering	neutral	eher hoch	hoch	sehr hoch
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Wie beurteilen Sie die Massnahme "Mechanische Unkrautbekämpfung (ohne Lenksystem oder Kamera)" hinsichtlich folgender Aspekte?

	sehr negativ	negativ	eher negativ	neutral	eher positiv	positiv	sehr positiv
Wirkung des Pflanzenschutzes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wirtschaftlichkeit (Kosten-Nutzen-Verhältnis)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Einfluss auf die Erntemenge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Einfluss auf die Erntequalität	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduktion des Einsatzes von Pflanzenschutzmitteln	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduktion der Risiken von Pflanzenschutzmitteln für Mensch und Umwelt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Bewertung der Massnahmen II

Wie viel Erfahrung konnten Sie bereits vor dem Projekt PestiRed mit der Massnahme "Mechanische Unkrautbekämpfung (ohne Lenksystem oder Kamera)" sammeln?

- gar keine wenig eher wenig mittel eher viel viel

Wie waren die Rückmeldungen und Reaktionen zur Massnahme "Mechanische Unkrautbekämpfung (ohne Lenksystem oder Kamera)" von Ihren Berufskollegen / -kolleginnen?

- keine erhalten negativ eher negativ neutral eher positiv positiv

Sind bei der Durchführung der Massnahme "Mechanische Unkrautbekämpfung (ohne Lenksystem oder Kamera)" organisatorische (z.B. Verfügbarkeit des Lohnunternehmers) oder technische Herausforderungen aufgetreten?

- Nein
- Ja, und zwar folgende:

Was spricht für die weitere Umsetzung der Massnahme "Mechanische Unkrautbekämpfung (ohne Lenksystem oder Kamera)" auf Ihrem Betrieb (z.B. positive Nebeneffekte, Synergien mit anderen Massnahmen)?