Plan nutrition to optimize plant health.

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SUSTAINABILITY AS A TOOL FOR A QUALITY BRAND

THE QUALITY MARK AS A MARKET TOOL

CROPS WITHOUT RESIDUES
Preliminary considerations

What is zero (pesticide) residues?

Is this term of production system correct?

How to get to this production system?

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PRELIMINARY CONSIDERATIONS

THE MOST LOGICAL: PESTICIDE MANAGEMENT

ONLY WITH THIS ELEMENT INVOLVED IN AGRICULTURAL PRODUCTION:

YOU'LL NEVER SUCCEED

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ELEMENTS NEEDED TO ACHIEVE RESIDUE-FREE PRODUCTION:

1. SOIL
2. WATER
3. CROP BOTANY
4. TECHNICAL MEANS
5. FERTILIZERS AND BIOSTIMULANTS
6. CROP PHYTOPATHOLOGY

7. ZERYA PRODUCT = RESIDUE-FREE PRODUCT

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ZERYA PRODUCT = RESIDUE FREE

COMPLEMENTARY ASPECTS?

A) Insecticide-fungicide-herbicide management:

WATCH OUT: Persistent Products

Number of repetitions

Formula

ZERYA PRODUCT = RESIDUE FREE

COMPLEMENTARY ASPECTS?

B) ZERYA's positioning towards organic products:
Plant-based preferable to extracts of microorganisms

Regulation:
Registered Microorganisms
Awareness of its limitations

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ZERYA PRODUCT = RESIDUE FREE

COMPLEMENTARY ASPECTS?

C) I get residues and I don't expect them:

causes and action

Application errors: dosage, location, products….

Drift (cross contamination)

Contamination of treatment wáter

Soil Contamination: Previous Crops

Organic matter

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ZERYA PRODUCT = RESIDUE FREE

COMPLEMENTARY ASPECTS?

D) Type of degradation of a formulation:

- Dilution
- Metabolic

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ZERYA PRODUCT = RESIDUE FREE

COMPLEMENTARY ASPECTS?

E) Degradation aids:

Dilution: Increase the specific gravity of the element to be collected, through the use of Ác. Humics, AAS (Betaine-Glycine), Calcium and/or Magnesium

Metabolic: Use of certain products that accelerate the breakdown of these active ingredients: Antitoxin

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Nutrition: From **foliar analysis** to **senescence study**

Foliar Analysis	Study of Senescence
It's a priori	Es a posteriori
It's a still photo of absorbable nutrients	It tells us the final result of nutrient assimilation.
In arable crops it can be easily altered	It reveals the actual behavior of nutrients and the concentration or lack of nutrients in the soil.
In woody crops, it can mask more typical deficiencies of the fruit	It makes it possible to plan and correct nutrition in the following cycles and balance both the soil and the plant's metabolism.

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THE **RESIDUE-FREE** PRODUCTION STRATEGY IS NOT COMPLICATED, WE MUST USE ALL THE AVAILABLE ELEMENTS AND A PREVENTIVE ACTION WHERE WE COMBINE ALL THE FACTORS THAT INTERVENE IN THE AGRICULTURAL PROCESS: **PLANT, FERTILIZATION, IRRIGATION, PHYTOSANITARY CONTROL, ELEMENTS OF PREDICTION AID (DIGITALIZATION)**, EXPERIENCE IN THE PLOT, ALL THIS TOGETHER WILL BE WHAT WILL MAKE OUR CROP A **ZERYA CROP**

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How is this applied to Crops?

Nutrition

- Soil-Plant interaction study.
- Recovering availability of soil's nutrients, (pH and structure).
- Water-related physiopathies.
- Dosage: Concentration, application moment & method.
- Senescence studies complemented by sap & foliar analysis.

Phytopathology

- Disease prevention culture.
- Inoculation with competitors or antagonists.
- Avoid N excess that boost fungal diseases and sap sucking insects.
- Correct Mg, Mn & Zn supplementation that affect the expression of varietal tolerance.

Biological Control

- Reduction of exposure to biocides = reduction of induced resistance.
- Classic Biological control.
- Preservation of natural enemies.
- Mating disruption.
- Mass trapping
- Use of beneficial microorganisms

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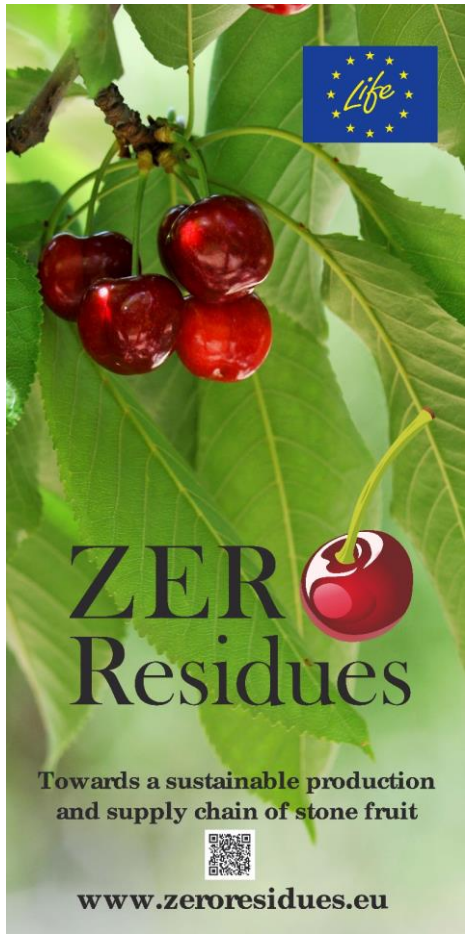

Soil Analysis		Peach	Cherry	Nectarine	Paraguayo	Apricot	Optimal Values
pH	Inicio	8.54	8.56	8.44	8.5	8.48	6.4-7.5
	Final	7.7	8.36	7.98	7.65	8.13	
Total N (%)	Inicio	0.03	0.04	0.05	0.12	0.06	0.11-0.22
	Final	0.19	0.11	0.24	0.22	0.11	
Organic Matter – SOM (%)	Inicio	2.03	1.82	2.38	3.81	1.89	2-2.5
	Final	3.56	1.16	3.77	4.08	1.82	
C/N Ratio	Inicio	43.71	25.19	28.24	18.93	17.17	9-11
	Final	10.67	6.36	9.17	10.64	9.89	
Assimilable P (mg/Kg)	Inicio	3.6	3.4	16.4	17.9	5.2	22-30
	Final	10.1	14.3	21.8	13.6	6.8	
Assimilable K (mg/Kg)	Inicio	228	124	123.5	157.3	177.5	150-300
	Final	202.2	208.4	663.6	197.3	196.3	
Assimilable Mg (mg/Kg)	Inicio	273.5	321.4	271.1	400.3	191.7	300-600
	Final	451.3	390.2	467.8	451.8	305.2	

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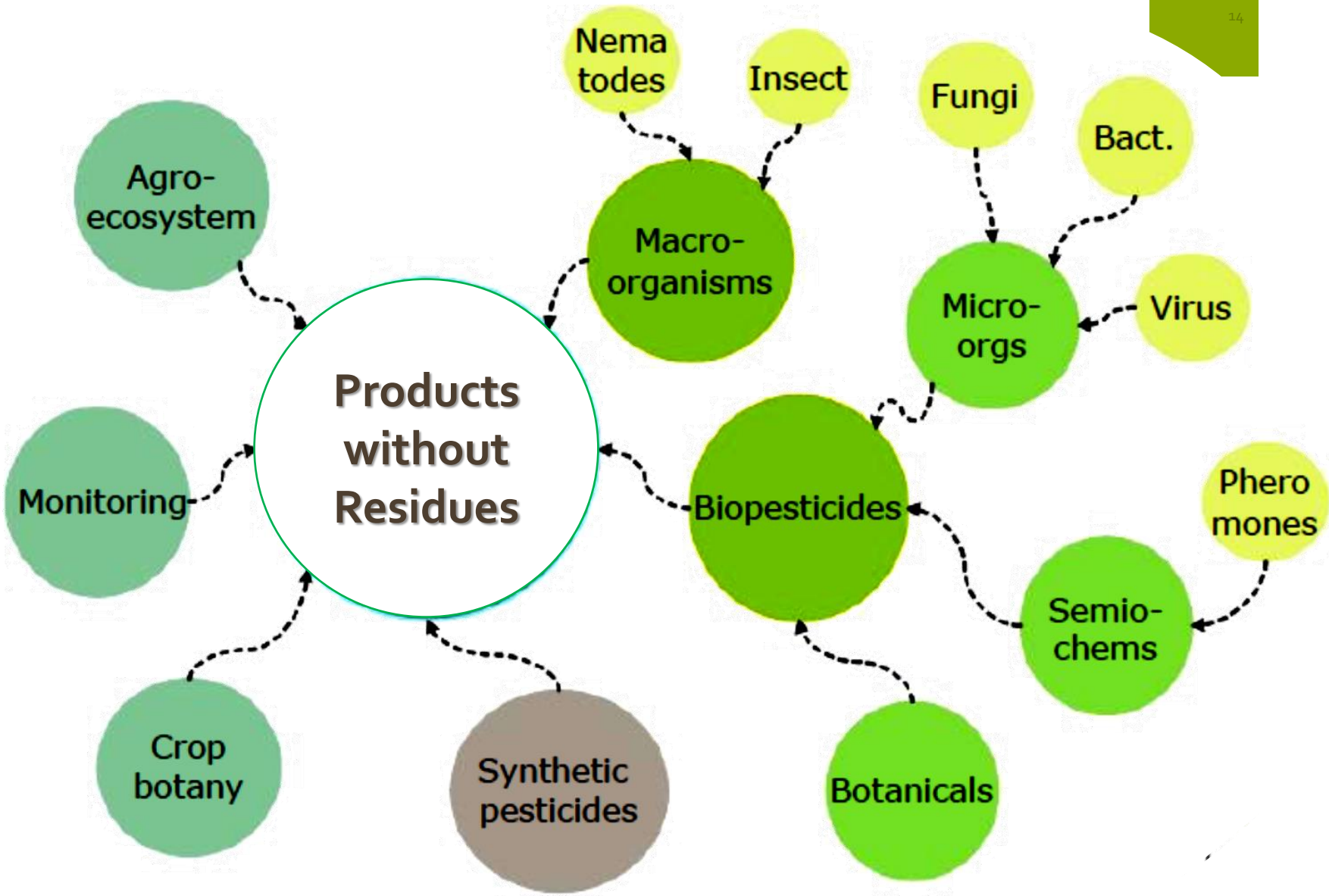
HOLYSTIC APPROACH



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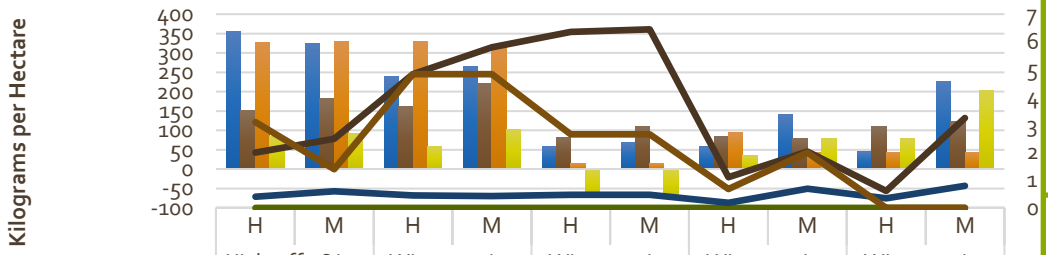
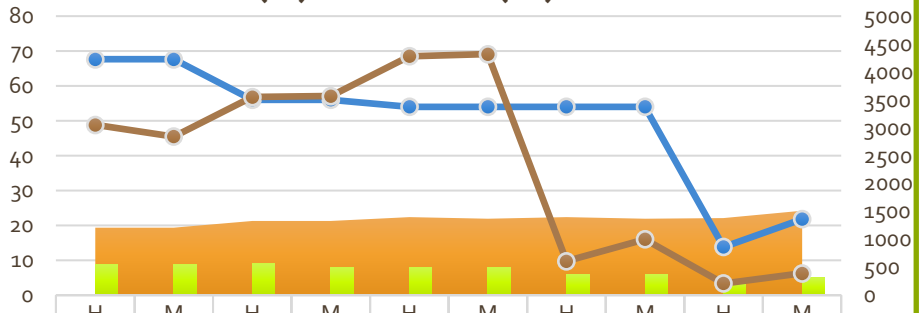
Implementation Examples during 4 years in Lettuce farms in Murcia

Winter season Indicators Herrero (H) & Mesilla (M) Farms



	H	M	H	M	H	M	H	M	H	M
	Kick-off 08/09		Winter 09/10		Winter 10/11		Winter 11/12		Winter 12/13	
Input N (kg N/Ha)	355,5	324	240	264	58	69	57	141	45,2	228
Input P (kg P/Ha)	152,3	181	161	220	83	109	85	80	110	124
Input K (kg KN/Ha)	328,8	329,4	330	323	14	15	94	44	44,2	44
Global balance of N (kg N/Ha)	85,3	92,7	60	102	-69	-70	36	80	79	203
Amt. Act. Ing. Herbicide (Kg/Ha)	0	0	0	0	0	0	0	0	0	0
Amt. Act. Ing. Insecticide (Kg/Ha)	0,4	0,6	0,45	0,42	0,47	0,47	0,183	0,688	0,342	0,797
Amt. Act. Ing. Fungicide (Kg/Ha)	2	2,5	4,83	5,81	6,36	6,46	1,108	2,033	0,605	3,25
Amt. Bio & Alt. Products (Kg/Ha)	3,1	1,4	4,84	4,84	2,66	2,66	0,683	2	0	0

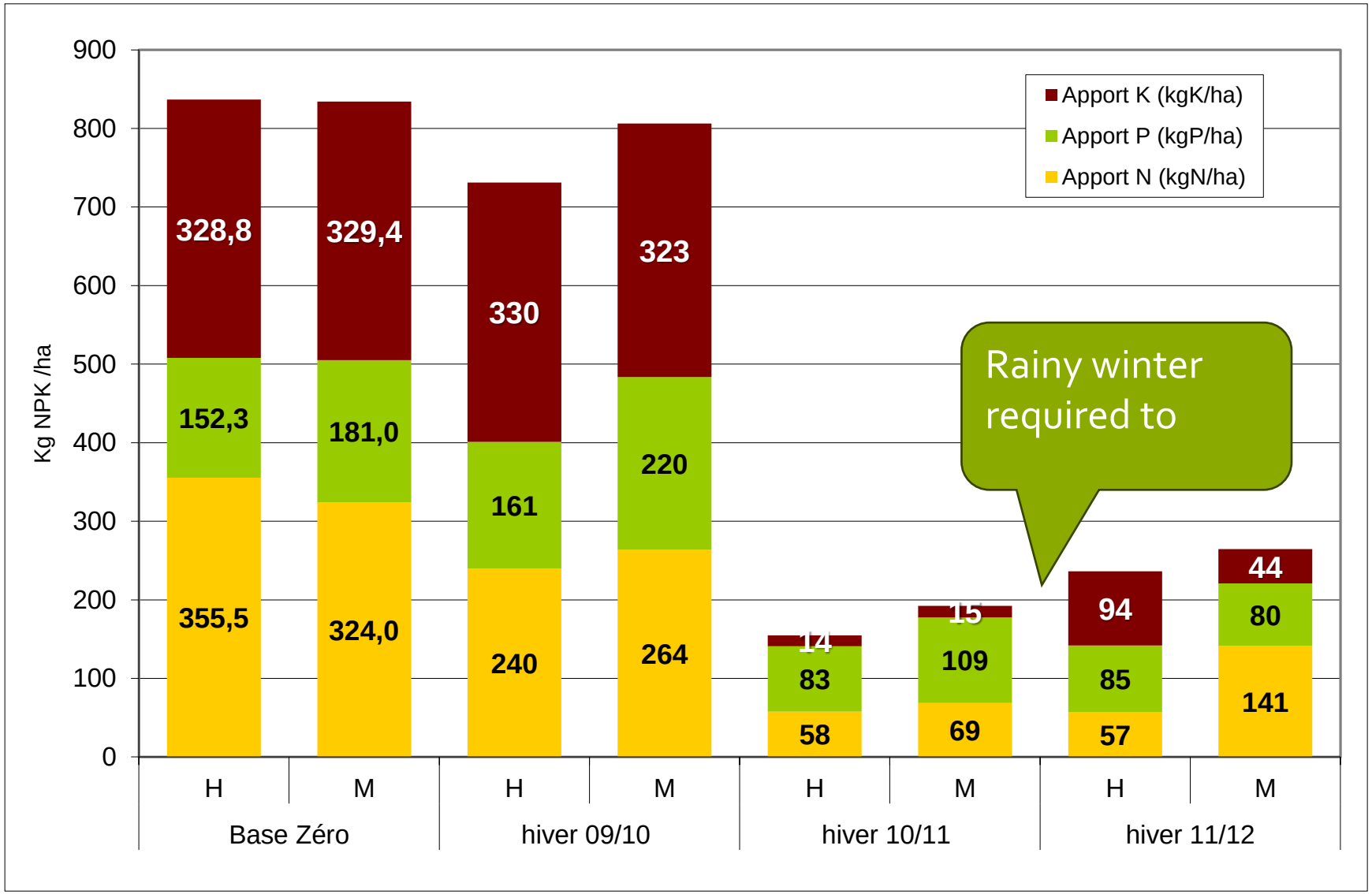
Winter season Efficencies & Yield Herrero (H) & Mesilla (M) Farms



	H	M	H	M	H	M	H	M	H	M
	Kick-off 08/09		Winter 09/10		Winter 10/11		Winter 11/12		Winter 12/13	
Yield (T/Ha)	19,3	19,3	21,3	21,3	22,4	21,9	22,4	21,9	22,1	24,2
No. of products used in Fertirrigation	0	0	0	0	0	0	0	0	0	0
Total number of interventions	8,7	8,7	9	8	8	8	6	6	4	5
Diesel consumption (L/Ha)	67,6	67,6	56	56	54	54	54	54	13,8	21,8
Amount of water used (L/Ha)	3049	2840	3548	3567	4281	4317	608	1001	210	390

SEASON		HERRERO	MESILLA
Before the Program	2005/06	Cipermetrine 0,35 ppm Imidacloprid 0,21 ppm Tau-Flauvalinate 0,30 ppm Acetamiprid 0,08 ppm	Tau-Flauvalinate 0,27 ppm Imidacloprid 0,32 ppm Acetamiprid 0,37 ppm
	2007/08	Ditiocarbamate 1,3 ppm Imidacloprid 0,24 ppm	Ditiocarbamate 0,77 ppm Imidacloprid 0,29 ppm Cipermetrine 0,31 ppm
	2008/09	Boscalide 0,42 ppm	Ditiocarbamate 1,74 ppm Dimetomorph 0,09 ppm
Program Kick-okk	2009/10	Cipermetrin 0,36 ppm	Cipermetrin 0,16 ppm
Program in Operation	2010/11	CLEAN	CLEAN
	2011/12	CLEAN	CLEAN
	2012/13	Imidacloprid 0,019 ppm	CLEAN

Evolución de aportaciones NPK – Campo de Cartagena



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Basic principles

More sustainable farming

ZERYA® crops use less resources, have a lesser carbon footprint, protect and often increase biodiversity, therefore they are more sustainable.

Biodiversity

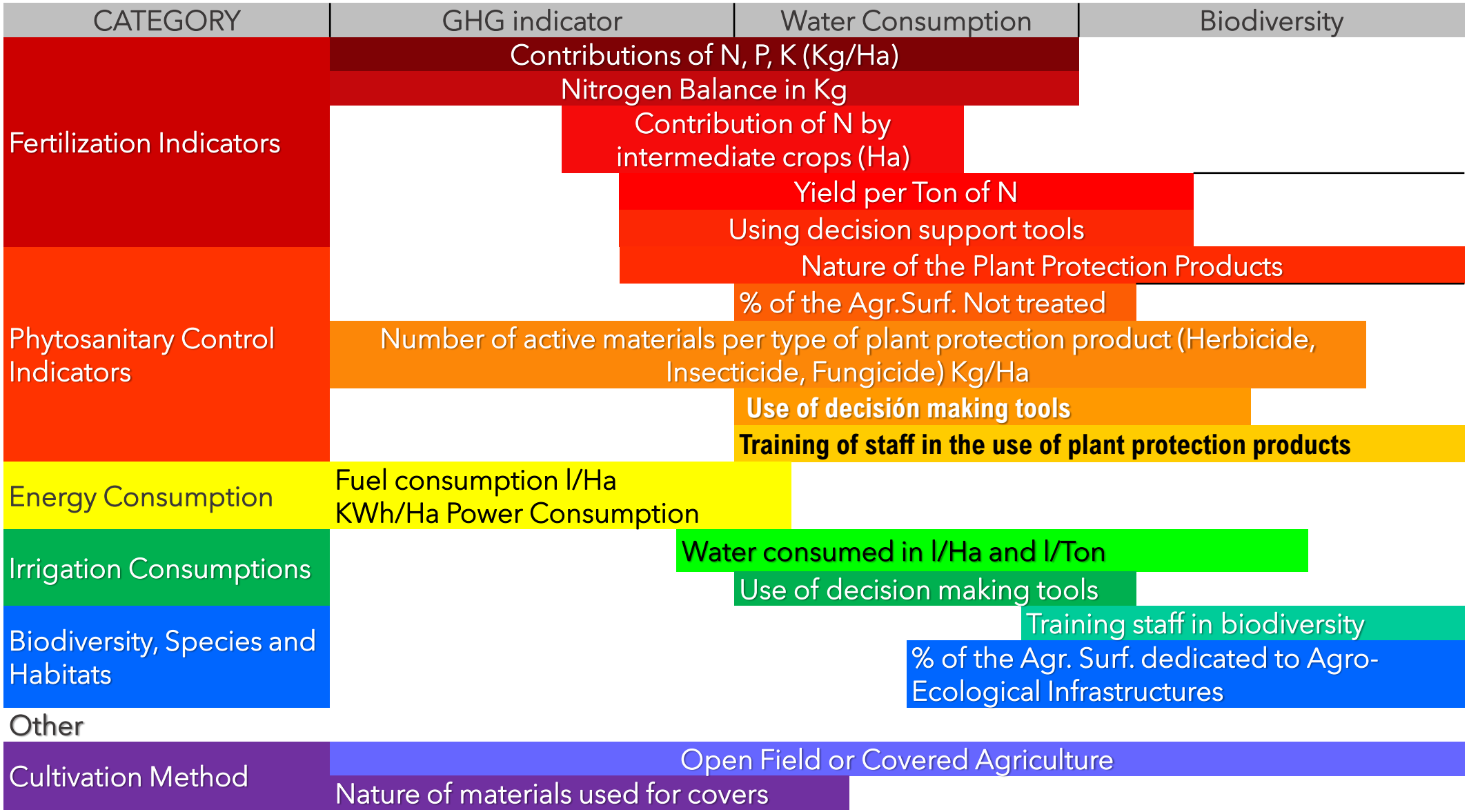
Beneficial wildlife is an important resource to protect by reducing the use of pesticides. Therefore ZERYA® farmers establish a treatment free zone in each plot, in some cases up to 30% of the area. This way nature's balance and beneficial wildlife like predatory insects benefit.

Fertilizer and energy use

The use of active composting techniques reduces machinery movements up to 90%. Moreover nitrogen, phosphorus and potassium supply are reduced considerably.

Crop protection

Decision making under ZERYA® system reduces the total dose of pesticides per crop. Furthermore, as the farmer can use exclusively the chemical and biological products out of a limited list of approved products, ZERYA® can measure benefits for soil, water and beneficial wildlife.


CATEGORY
GHG indicator
Water Consumption
Biodiversity
Fertilization Indicators
Contributions of N, P, K (Kg/Ha)
Nitrogen Balance in Kg
Contribution of N by intermediate crops (Ha)
Yield per Ton of N
Using decision support tools
Phytosanitary Control Indicators
Nature of the Plant Protection Products
% of the Agr.Surf. Not treated
Number of active materials per type of plant protection product (Herbicide, Insecticide, Fungicide) Kg/Ha
Use of decisión making tools
Training of staff in the use of plant protection products
Energy Consumption
Fuel consumption l/Ha
KWh/Ha Power Consumption
Irrigation Consumptions
Water consumed in l/Ha and l/Ton
Use of decision making tools
Biodiversity, Species and Habitats
Training staff in biodiversity
% of the Agr. Surf. dedicated to Agro-Ecological Infrastructures
Other
Cultivation Method
Open Field or Covered Agriculture
Nature of materials used for covers

Thanks for your attention!

For further information:

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