

Workshop 'Innovative arable crop protection – using pesticides sustainably'

Amsterdam, the Netherlands
19-21 April 2023



Funded by
the European Union

Integrated Crop Management-

A framework to support design and adoption of
IPM strategies at farm level

Marleen Riemens
Support Facility 'Innovation & Knowledge exchange | EIP-AGRI'

Workshop 'Innovative arable crop protection – using pesticides sustainably' | Amsterdam, the Netherlands | 19-21 April 2023



Funded by
the European Union

Current food systems

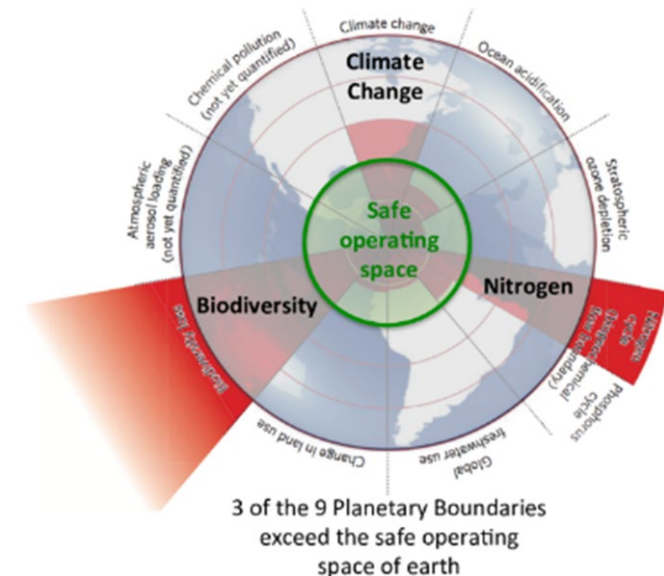
- › Efficient;
- › Large negative externality costs:
 - › Biodiversity decline
 - › Emissions:
 - › Nutrients
 - › Green house gases
 - › Pesticides;
- › Resilience to external shocks?

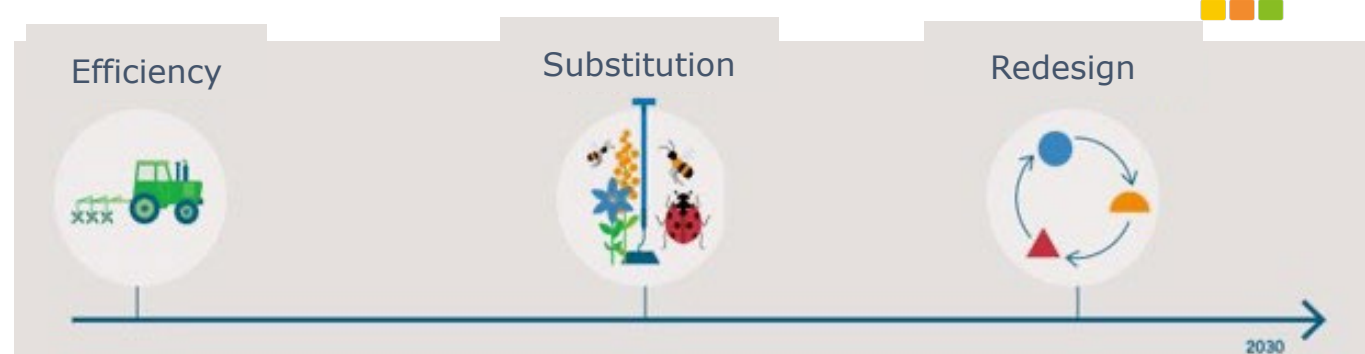


What properties do we want our agricultural systems to have?

- Delivery of ecosystem services within the cropping area
- Low negative externality costs of production (emissions of nutrients, pesticides)
- Resilient to environmental changes
- Sufficient healthy food, match a healthy diet
- Give more options for land use change for bioproduction and nature restoration

Transition is required to live within planetary boundaries





Redesign of systems

3 phases in the transition to durability*

- Efficiency (green revolution)
- Substitution (Sustainable Use Regulation/ Farm to Fork)
- Redesign (not yet realised)

So far focus has been:

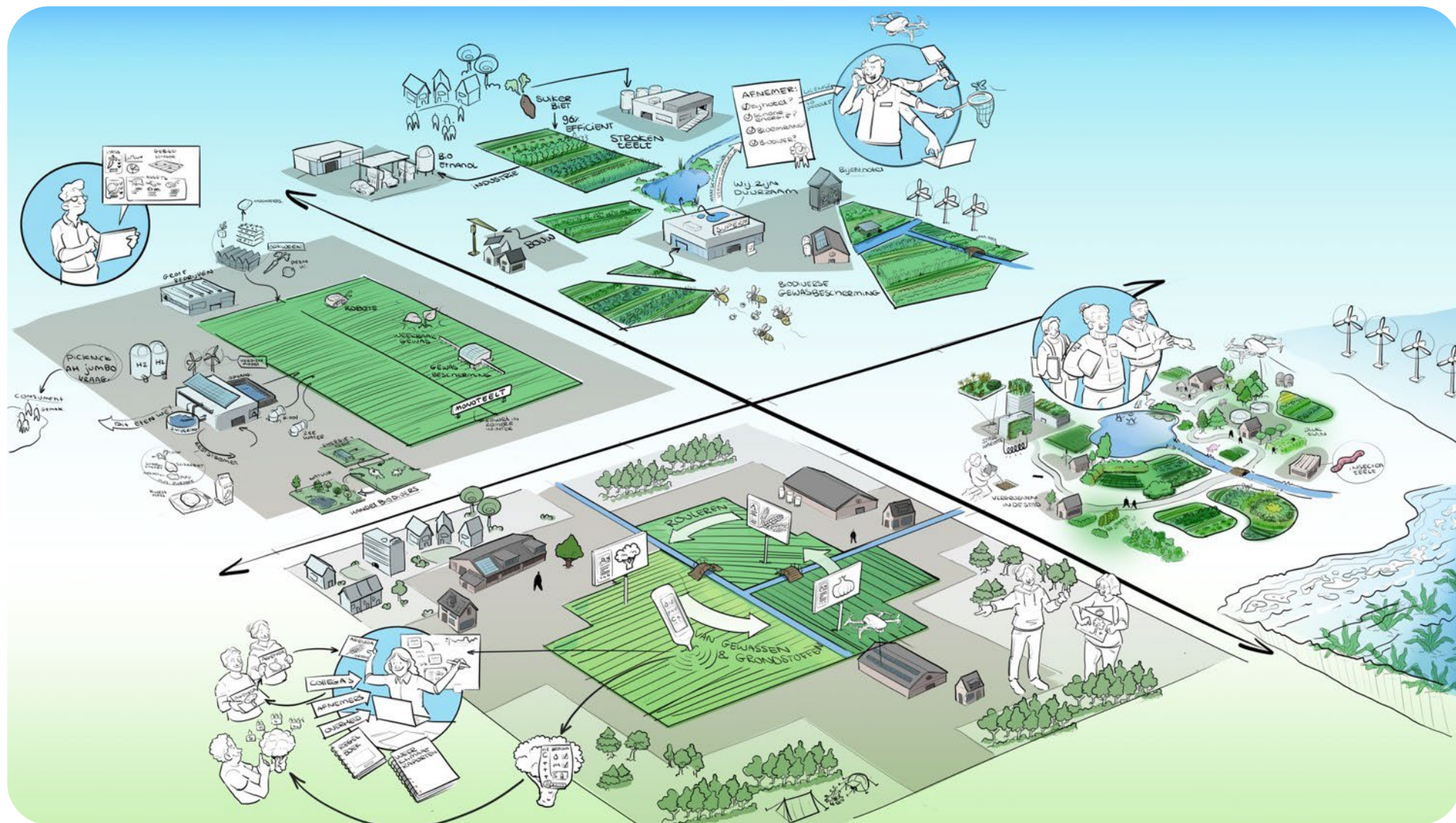
- Increasing the efficiency (e.g. simplification, mechanisation, economies of scale, crop protection products)
- Substitution of chemical measures by mechanical, physical or biological control measures has been the principal drive

Truly integrated pest, disease and weed control requires a redesign of the system
A complex step towards durability:

- A paradigm change towards Integrated Crop Management
- From single (season) targeted control measures towards an integrated, multi-season, farm or regional level integrated approach.

(*MacRae et al., 1990)

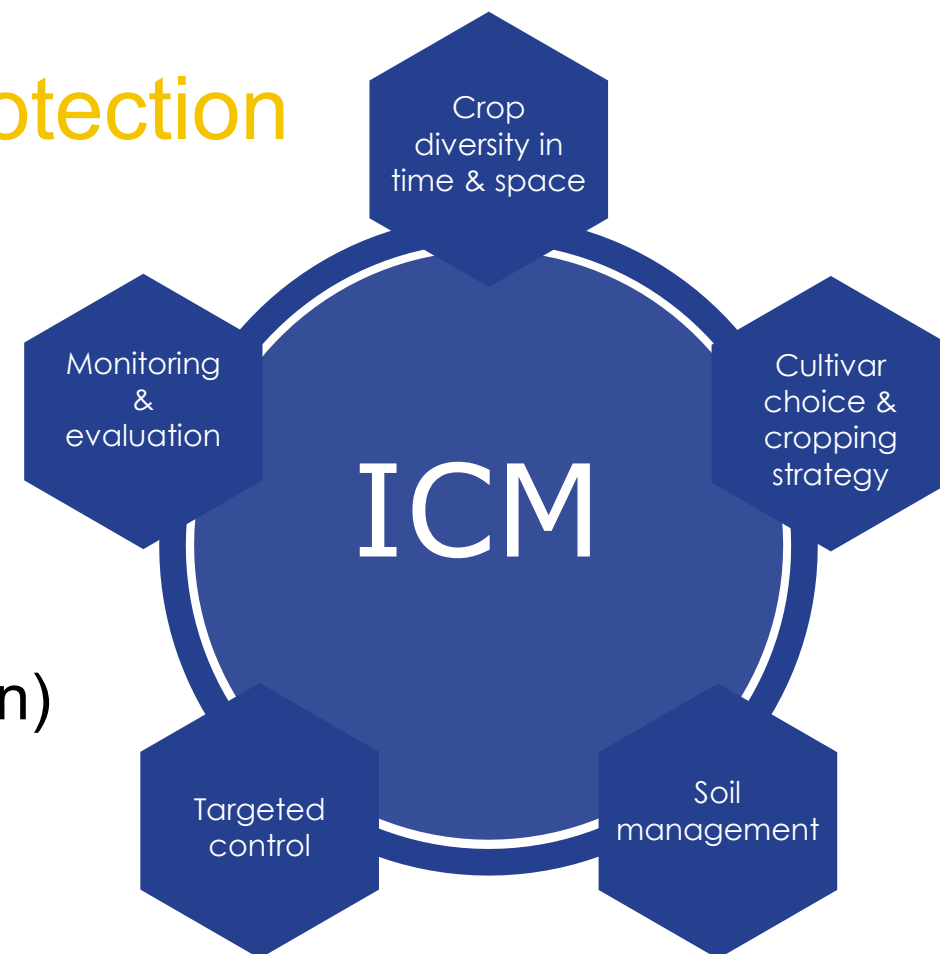
There is no single future scenario



ICM- Integrated Crop Management

A framework for redesigning crop protection

1. Crop diversity
2. Robust cultivars
3. Soil management
4. Direct, smart and precise, control techniques
5. Proper monitoring & evaluation (and adaptation)



Adapted from: www.iwmpraise.eu, Riemens et al (Eur. Journ of Agronomy, 2022)

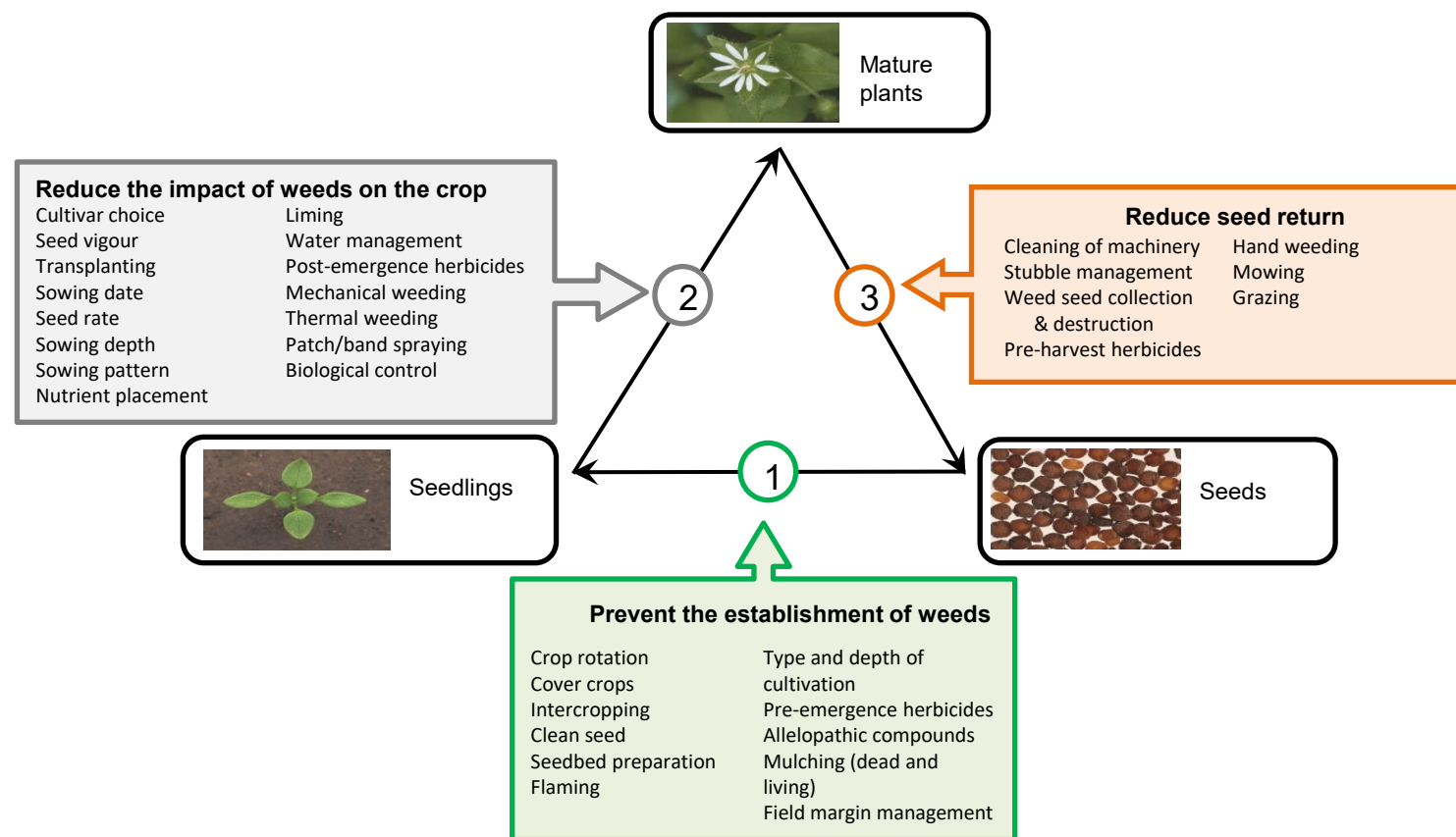


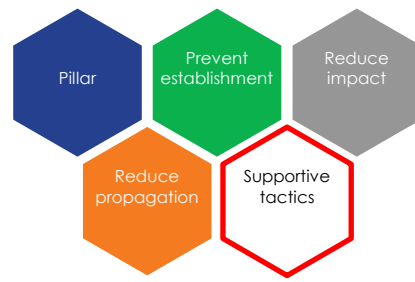
IWMPRAISE EU grant agreement N° 727321

Start of development: IWM

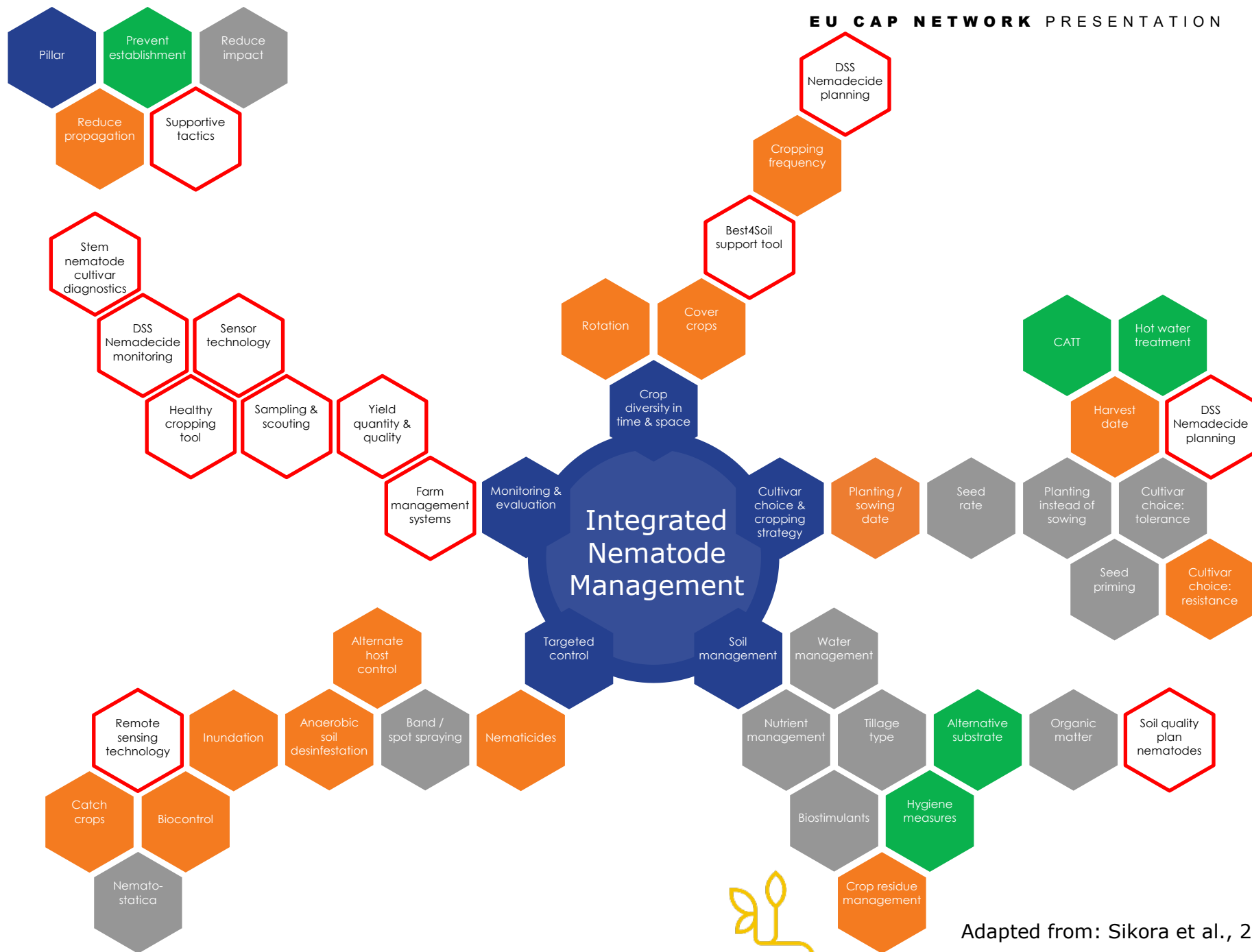
Integrated Weed Management focuses on the management of weed populations at a time scale *extending the current growth season* by impacting weeds during several parts of the weed life cycle, either through:

- Reduction of seed rain;
- Prevent establishment of weed seedlings;
- Prevent seedlings to mature.









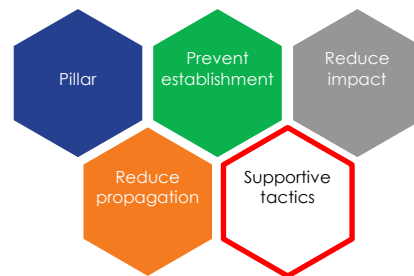
**Integrated Nematode Management:
State-Of-The-Art And Visions For The
Future**

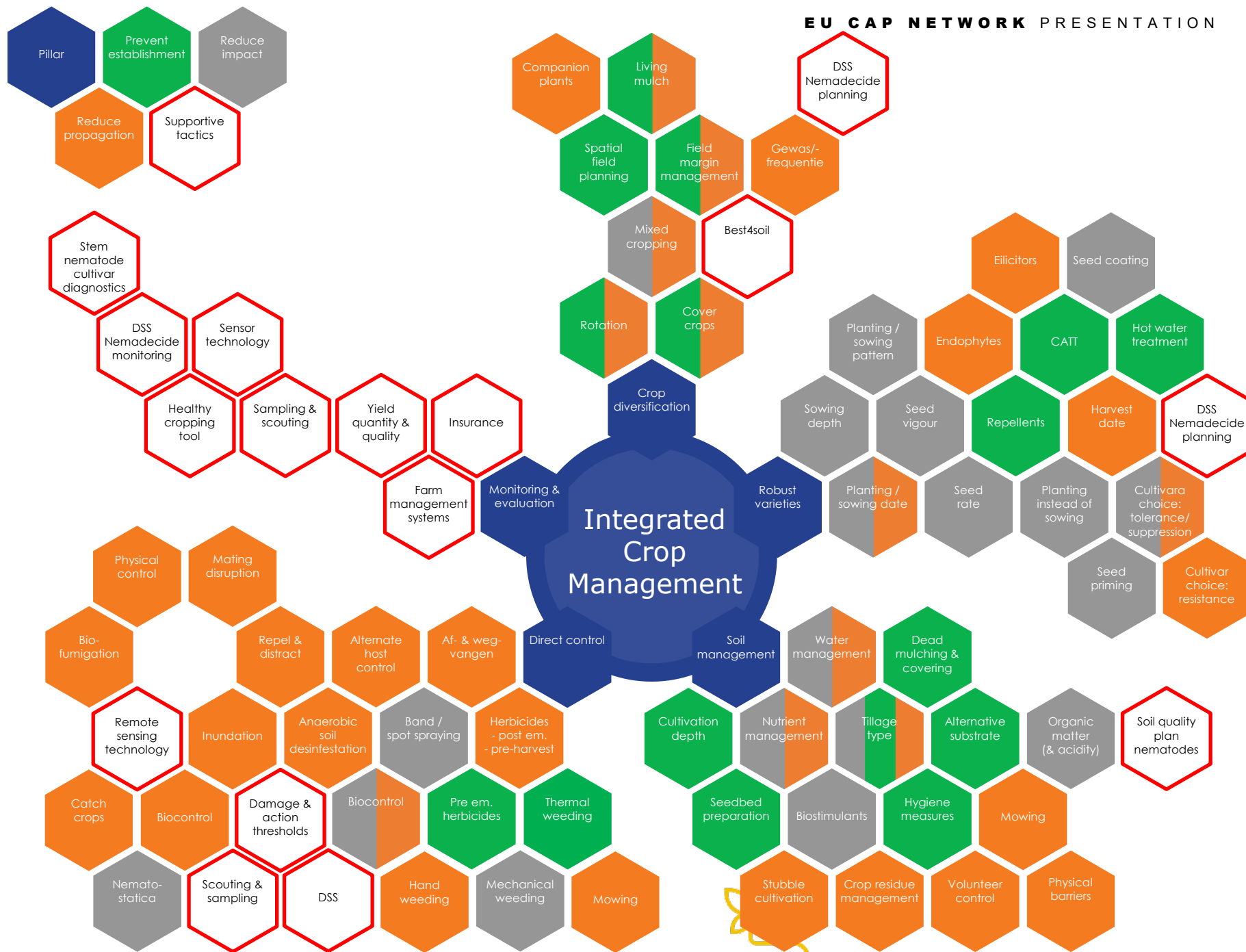
Richard A. Sikora, Johan Desaeger, Leendert Molendijk

[View information](#)

[Read this book](#)







Redesign crop systems for pest, disease, and weed management

Sand, 2020-2027



Clay, 2018-2025



Farm of the Future, 2020-2024



Objective: to reduce pesticide dependency, no use of **Candidates for Substitution (CFS)**

Redesign crop systems based on ICM

Goal: increased independency of pesticides without CfS

Cultivar
choice &
cropping
strategy

PPS Akkerbouw op Zand
Vredepeel



Since
2020

Crops	frequency
Potato	1:4
Sugarbeet	1:4
Winterwheat	1:8
Maize	1:8
Carrot	1:8
Seeding onion	1:8

BO Groene Gewasbescherming
Lelystad



Since
2018

Crops	frequency
Potato	1:4
Sugarbeet	1:8
Winter wheat	1:8
Cabbage	1:8
Carrot	1:8
Seeding onion	1:8
Grass clover	1:8

Preliminary results

In ICM:

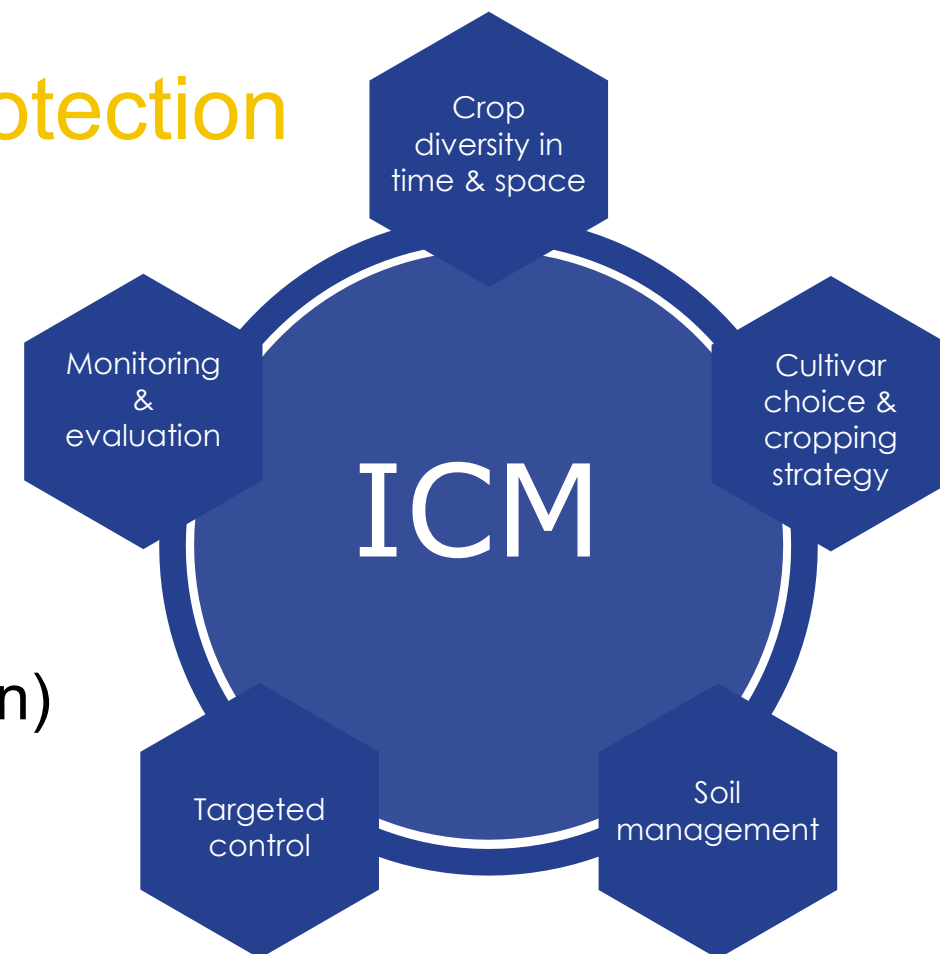
- CFS reduced by 100%
- Pesticide reductions from 20-90% depending on year and crop, average ~50%
- The economic yield loss in ICM is 5-10% compared to the reference system
- Environmental impact strong reduction

But note- this system changes the supply/demand equation and so what will this mean for uptake?

ICM- Integrated Crop Management

A framework for redesigning crop protection

1. Crop diversity
2. Robust cultivars
3. Soil management
4. Direct, smart and precise, control techniques
5. Proper monitoring & evaluation (and adaptation)



Adapted from: www.iwmpraise.eu, Riemens et al (Eur. Journ of Agronomy, 2022)



IWMPRAISE EU grant agreement N° 727321

EU CAP Network workshop

‘Innovative arable crop protection - using pesticides sustainably’

19-21 April 2023

Amsterdam, The Netherlands

All information on the workshop is available on the event webpage:

https://eu-cap-network.ec.europa.eu/events/eu-cap-network-workshop-innovative-arable-crop-protection-using-pesticides-sustainably_en

