



THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT N. 101000339

SEGES
INNOVATION



Seminar in Demark on IPM implementation

The seminar was organized in cooperation with a nationally funded project on innovation farms.

Participants from both IPMWORKS, Innovation farms in DK and the Danish environmental protection agency were present. This means that farmers, advisors (local advisory service and national advisory service), consultants from the seed production sector, researchers and policy makers were represented with a total of 23 participants. The agenda was as listed below.

Agenda 7. November 2022

Cropping systems in the future

– joint meeting between IPMWORKS and Danish IPM innovation farm project

Location Velas Vissenbjerg, Damsbovej 11, 5492 Vissenbjerg, Denmark

Programme

10.00 **Arrival and coffee**

10.15-11.15 **Innovation farms and IPM network**

IPMWORKS by Mette Sønderskov, Aarhus University + the two hubcoaches
IPM Innovation farm project by Poul Henning Petersen, SEGES Innovation

11.15-12.00 **How should the cropping systems of the future include IPM?**

We will discuss new cropping strategies, which makes us less dependent on chemical pesticides incl. The long-term perspective

Pairwise discussion (approx. 15 min).

The pairs find another pair and discuss what they have been talking about (approx. 15. min).

12.00-12.15 **Summarising the discussion and a talk about challenges in future IPM**

12.15-12.45 **Lunch**

12.45-13.00 **The upcoming EU regulation on sustainable use, Pesticide action plan 2022-2026 and CAP-reform – What direction is agriculture heading in terms of pesticide use?**

by Poul Henning Petersen, SEGES Innovation.

13.00-13.30 **How can we decrease dependence on chemical pesticides on the short term**

Participants will divide in groups depending on main production, e.g. seed production, fodder production or cash crops

Which IPM tactics can make the largest difference in relation to challenges connected to grass weeds, resistance, pesticide reductions and use of glyphosate.



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13.30-13.45 Coffee break

13.45-14.00 Closing remarks

For further information contact Poul Henning Petersen, SEGES (php@segres.dk) or Mette Sønderskov, Agroøkologi, Aarhus University (mette.sonderskov@agro.au.dk)

The two projects have a common goal of increasing the implementation of IPM among Danish farmers. Where IPMWORKS builds on groups of farmers to increase knowledge exchange, the Danish project focus on three specific farmers representing three very different farming systems, both in terms of size and cropping strategy. These three farmers are committed to implement a wide variety of IPM tactics during the three-year project. The common workshop was organised to share thoughts and ideas and to make use of synergies between the two initiatives.

In Denmark, there is a long tradition for farmers to organise experience exchange groups (ERFA-groups) with connection to the local advisory service. The ERFA-groups are not necessarily on IPM but connect farmers in a geographically close area with similar interest on a subject. This might be conservation agriculture, digital crop protection or just “farming”. Many of these groups have been in place for more than 15 years and the farmers know each other very well. IPMWORKS in Denmark have used this tradition to form the two hubs, which are led by Velas and Djursland Landboforening.

The three farmers from the Danish Innovation farm project can be described briefly as follows:

1. Small single-person farm with a large piglet production, plant production mainly focuses on fodder for the pigs. This farm has a serious problem with ryegrass and resistance has been confirmed for ALS herbicides. IPM tactics: Changes to the crop rotation, delayed sowing, change to reduced/no-till system etc.
2. Very large farm with a very diverse crop rotation differing across the farm (several single farms merged into one). Problems with *Vulpia* in grass for seed production. IPM tactics: precision farming (increase digitalisation), graduated fertilisation and growth regulators, increase monitoring and evaluation, changes to crop rotation etc.
3. Middle sized conservation agriculture farmer with production of grass for seeds. The main topic here is to reduce the pesticide use. No major problems at the moment,



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but some blackgrass and *Vulpia*. The focus is on cover crop selection and consideration of implementing a row production systems in the production of grass, which will necessitate some soil tillage, but will enable mechanical weeding the grass fields. Thresholds for insect pest are implemented and push-pull strategies related to oilseed rape fields.

The day started with presentation of the two projects by the two project managers + two hub coaches from IPMWORKS, Mette Sønderskov (AU) plus Helle Elander for Velas and Mikkel M. Østerhaab for Djursland Landboforening, for IPMWORKS and Poul Henning Petersen (SEGES) for the Danish Innovation farm project (presentation for IPMWORKS in appendix 1). This was to inform the participants from the other project about the content of the two projects and to connect the projects to increase cooperation.

For IPMWORKS the general concept of the network and some results from Survey #1 were included in the presentation. The hub coaches presented some of the IPM strategies they have worked with in the hubs.

Both hubs are focussing on management of grass weeds and some of the topics included are the establishment of cover crops (the soil tillage needed to have a good establishment and the type of cover crops), how to establish spring barley and the related soil tillage strategy, rotational ploughing, soil weed seed management, in addition to these grass weed strategies, the hubs have, among other IPM tactics, worked with thresholds for insect pests and the crop rotation in general.

Following the project presentation the rest of the day was mainly allocated to interaction between the participants.

IPM in Denmark has been in focus for many years and gradually become part of a “normal” practice. This means that farmers with e.g. grass weed problems already implement a long list of IPM practices because it has become the common practice. This might be delayed sowing of autumn sown cereals, increased amount of spring crops or rotational soil tillage/reduced soil tillage. Even with these practices well incorporated into the cropping system, herbicide resistance is still an increasing problem for grass weeds. Therefore, the workshop focussed on innovative strategies to reduce the reliance on chemical pesticides (Figure 1).



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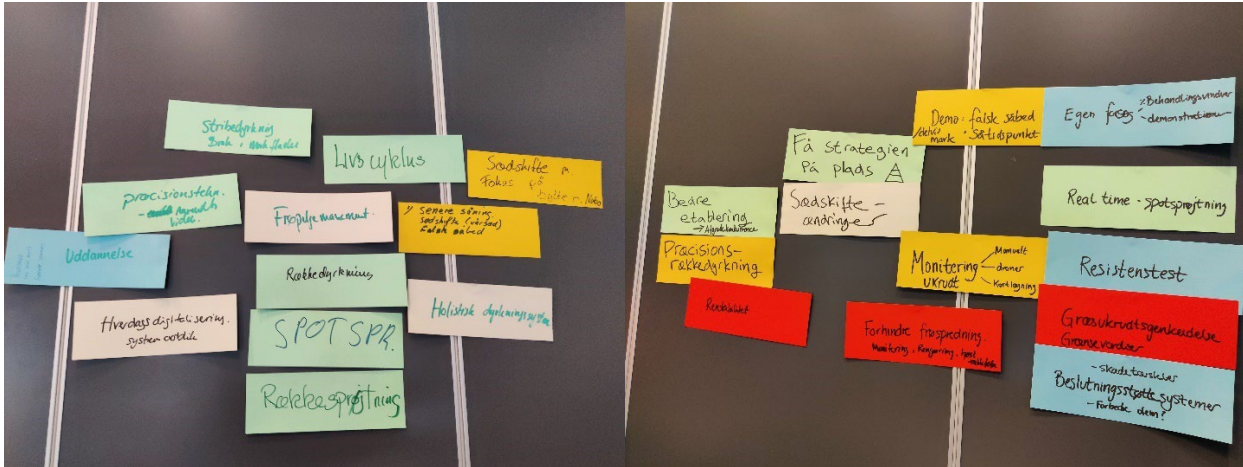


Figure 1: the participants were asked to add the tactics that they saw as the main tactics to reduce reliance on chemical pesticide, both with a short- and long-term perspective.

The participants were asked to discuss in pairs followed by small groups, and we eventually had a plenum discussion and wrap up for the individual agenda items. There was a very fruitful experience exchange between the participants from the two projects.



Figure 2: pairwise discussion with member of the other project

The planned changes in the SUR and the CAP reform, plus national pesticide action plan was discussed after Poul Henning Petersen (SEGES) gave a short update on the different regulations and directives.

Appendix with presentations from the workshop

Cultivation systems of the future

– joint meeting between the projects IPMWORKS and IPM Innovationsbrug

10.00 Arrival and coffee

10.15-11.15 Innovation use and IPM network

IPMWORKS v/ Mette Sønderskov, Aarhus University

IPM Innovation use v/Poul Henning Petersen, SEGES Innovation

11.15-12.00 How should future cultivation systems include IPM?

12.00-12.15 Summary of solutions and challenges for the IPM of the future

12.15-12.45 Lunch

Cultivation systems of the future

– joint meeting between the projects IPMWORKS and IPM Innovationsbrug

12.45-13.00 Upcoming EU regulation on IPM, Pesticide strategy 2022-2026 and CAP reform - what direction is there for future plant protection?

v/ Poul Henning Petersen, SEGES Innovation.

13.00-13.30 How can we best make ourselves less dependent on pesticides in the very short term

13.30-13.45 Coffee

13.45-14.00 Collection and thanks for today



IPMWORKS

An EU- wide farm network demonstrating and promoting cost-effective IPM strategies

A network of farms in Europe demonstrating and promoting cost-effective IPM strategies

Joint meeting IPMWORKS and Innovationbrug DK
Mette Sønderkov, Aarhus University, Flakkebjerg



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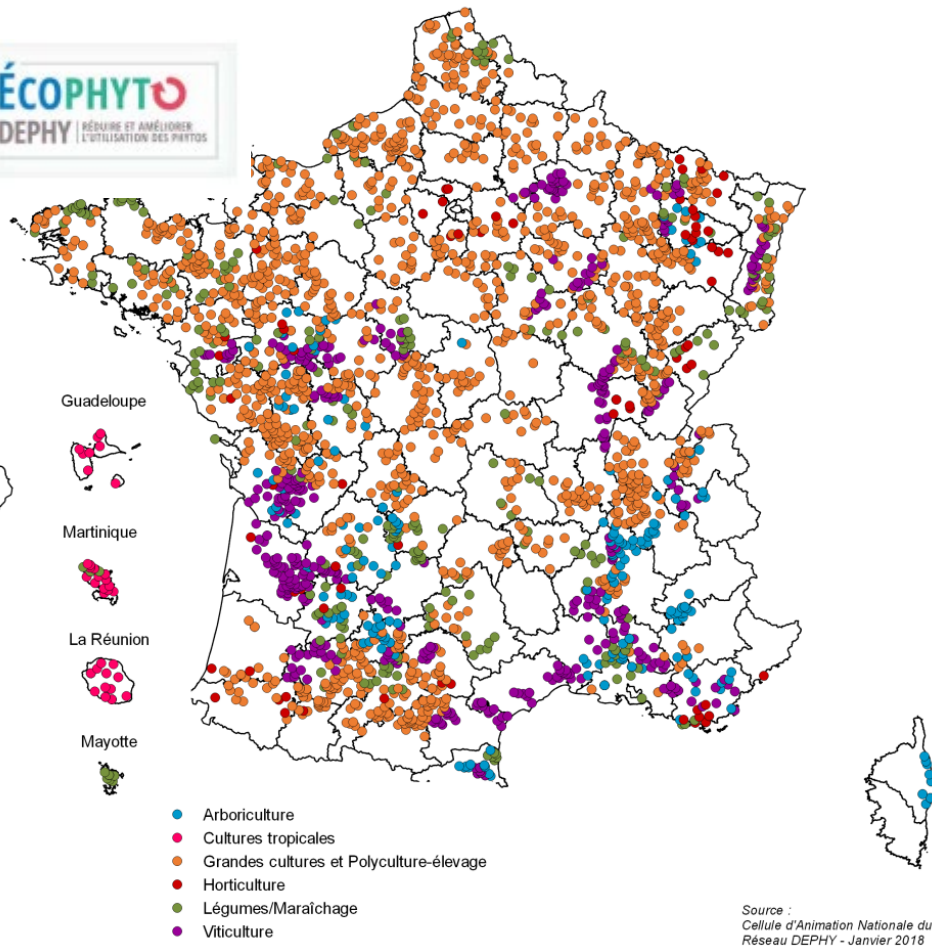
Purpose

Reduce reliance on pesticides in economically viable systems

Demonstrate that it can be achieved via IPM – important with adaptation to current conditions

Promote the implementation of the knowledge we already have about IPM

Create a network of demonstration farms and advisers to support this



Furthermore, it is based on German, Dutch and Swiss experiences and ideas



The IPMWORKS Network

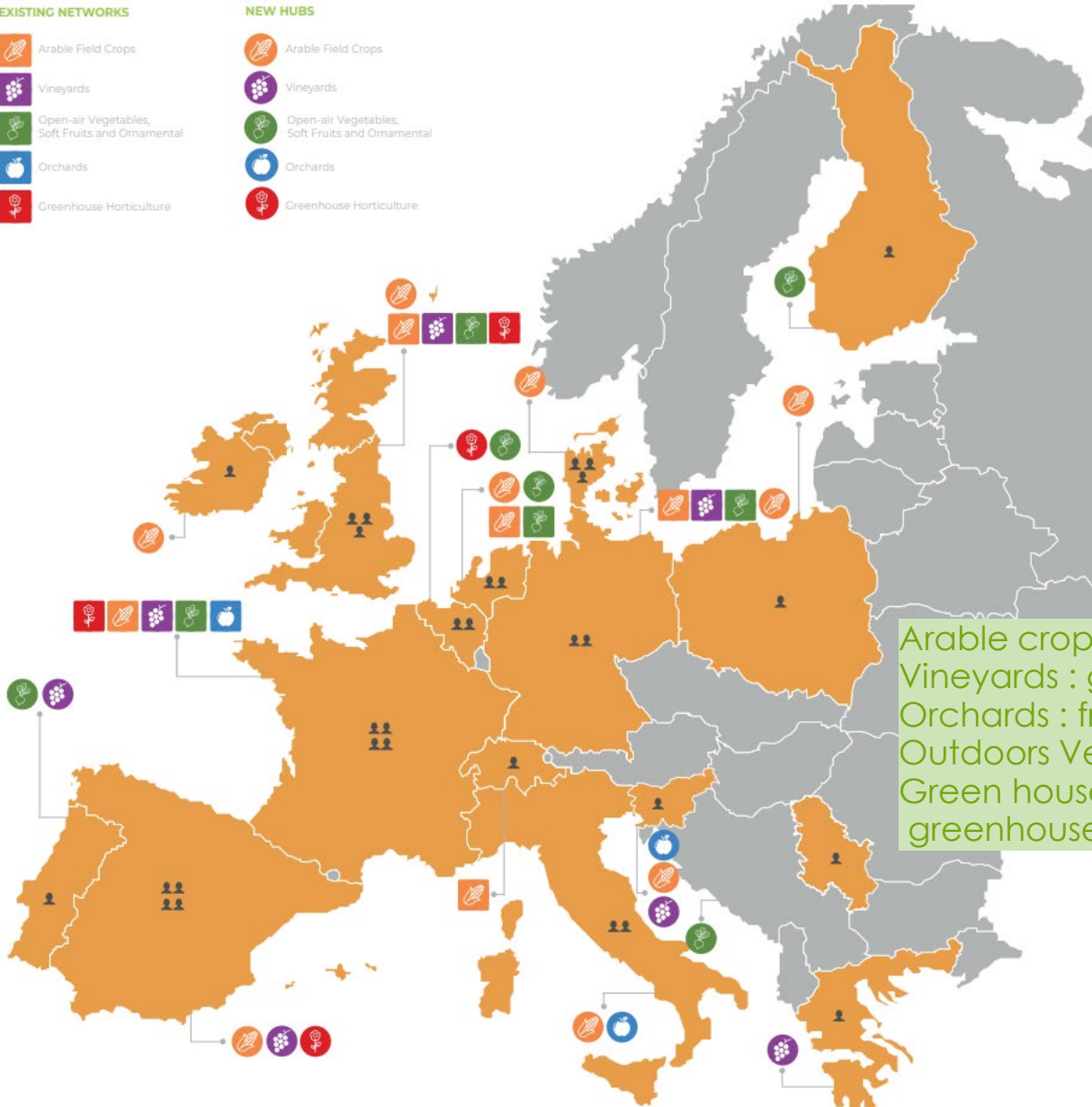
NUMBER OF PARTNERS

EXISTING NETWORKS

- Arable Field Crops
- Vineyards
- Open-air Vegetables, Soft Fruits and Ornamental
- Orchards
- Greenhouse Horticulture

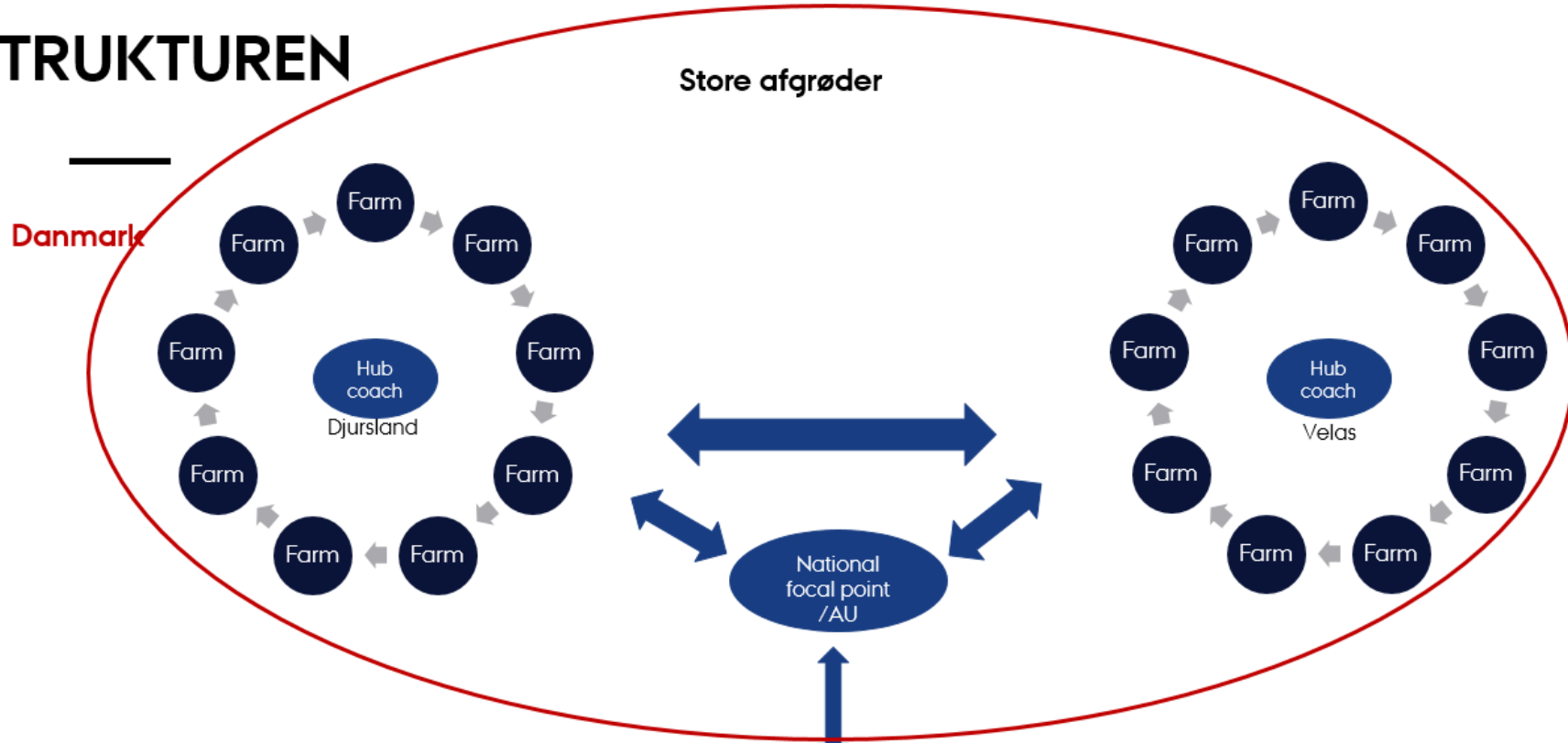
NEW HUBS

- Arable Field Crops
- Vineyards
- Open-air Vegetables, Soft Fruits and Ornamental
- Orchards
- Greenhouse Horticulture



Arable crops : grain, rape etc
Vineyards : grapes
Orchards : fruit, olives
Outdoors Vegetables : vegetables
Green house horticulture :
greenhouse production

STRUKTUREN



Exchange of experience for both farmers and advisers

The network for advisers:

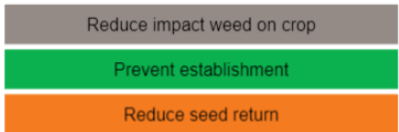
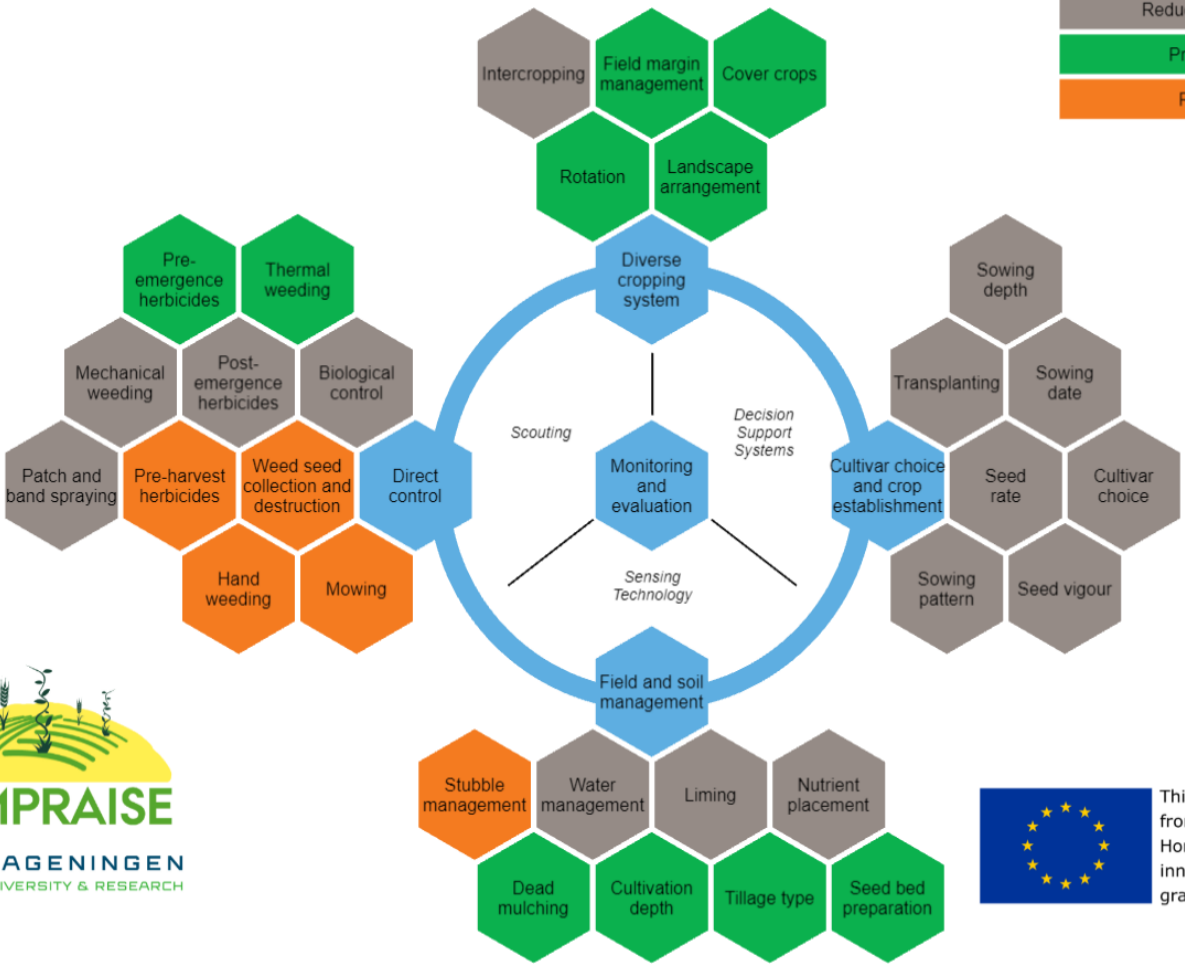
Technical professional: IPM initiative
Communication and dissemination

The network for farmers:

European ERFA groups
Focus on demonstrations and field days



Crop Group Weed Group



Diverse cropping system

- Rotation
- Cover crops
- Field margin management
- Landscape arrangement
- Intercropping

Cultivar choice and establishment

- Seed rate
- Transplanting
- Sowing date
- Cultivar choice
- Sowing depth
- Seed vigour
- Sowing pattern

Field and soil management

- Seed bed preparation
- Cultivation depth
- Tillage type
- Stubble management
- Dead mulching
- Water management
- Liming
- Nutrient placement

Direct control

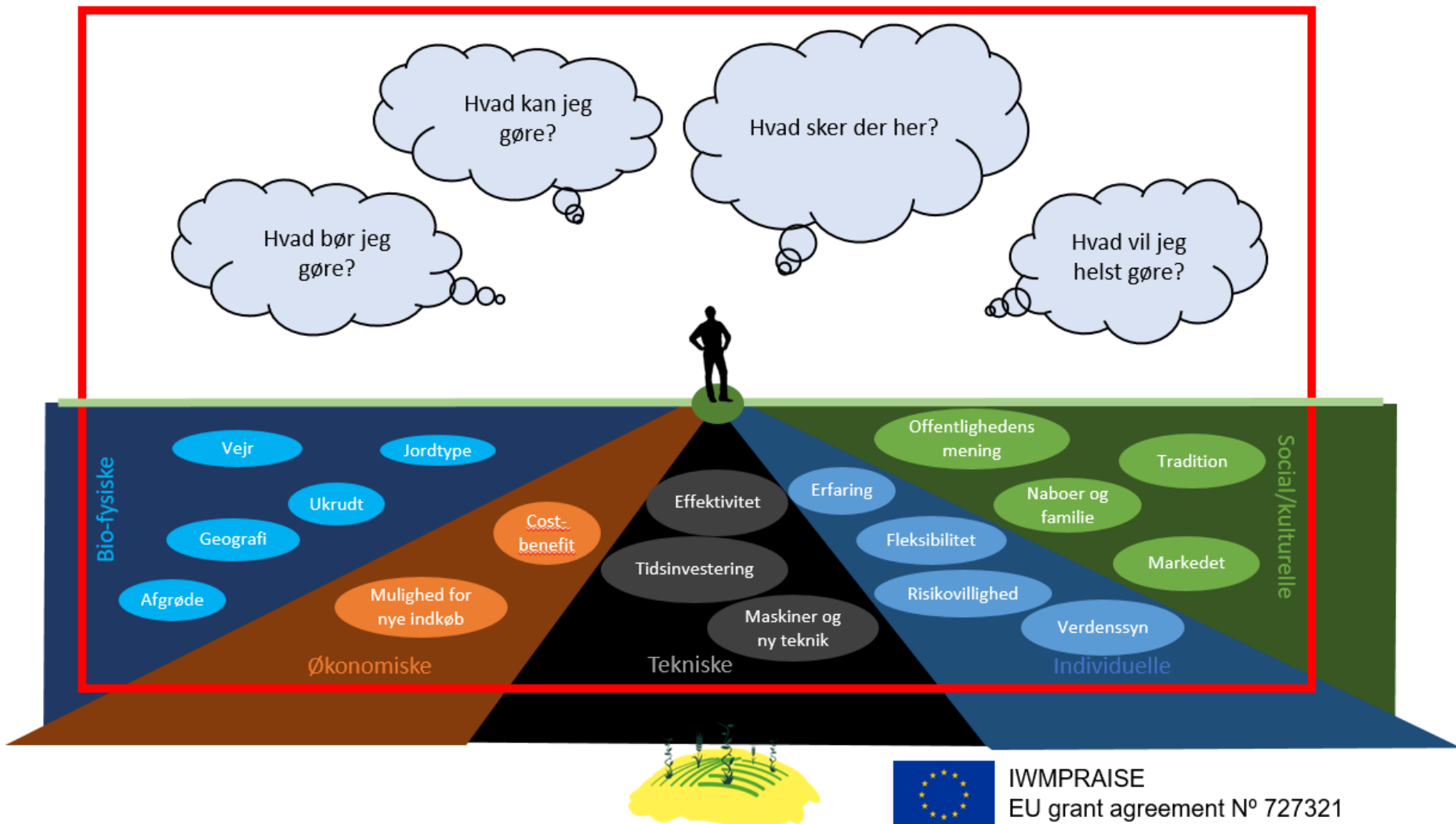
- Pre-emergence herbicides
- Mechanical weeding
- Post-emergence herbicides
- Hand weeding
- Thermal weeding
- Pre-harvest herbicides
- Mowing
- Patch and band spraying
- Weed seed collection and destruction
- Biological control



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Lovgivningsmæssige faktorer



IWMPRAISE
EU grant agreement N° 727321

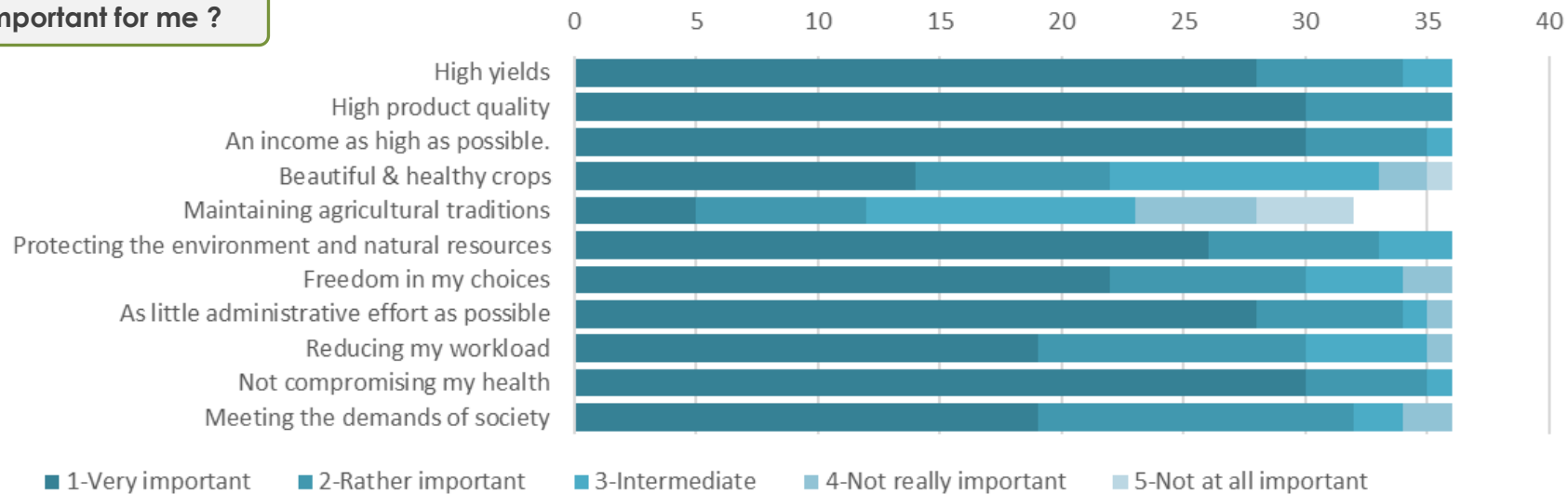
Some results from the questionnaire

- not all data received, 37 farmers' answers from DK, DE, IT, UK

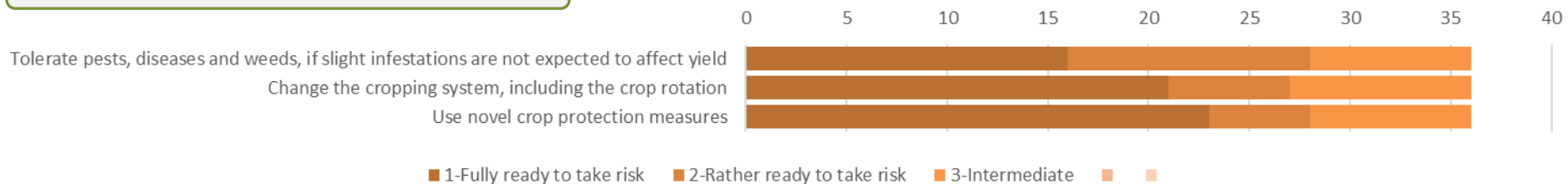
Arable Field crops



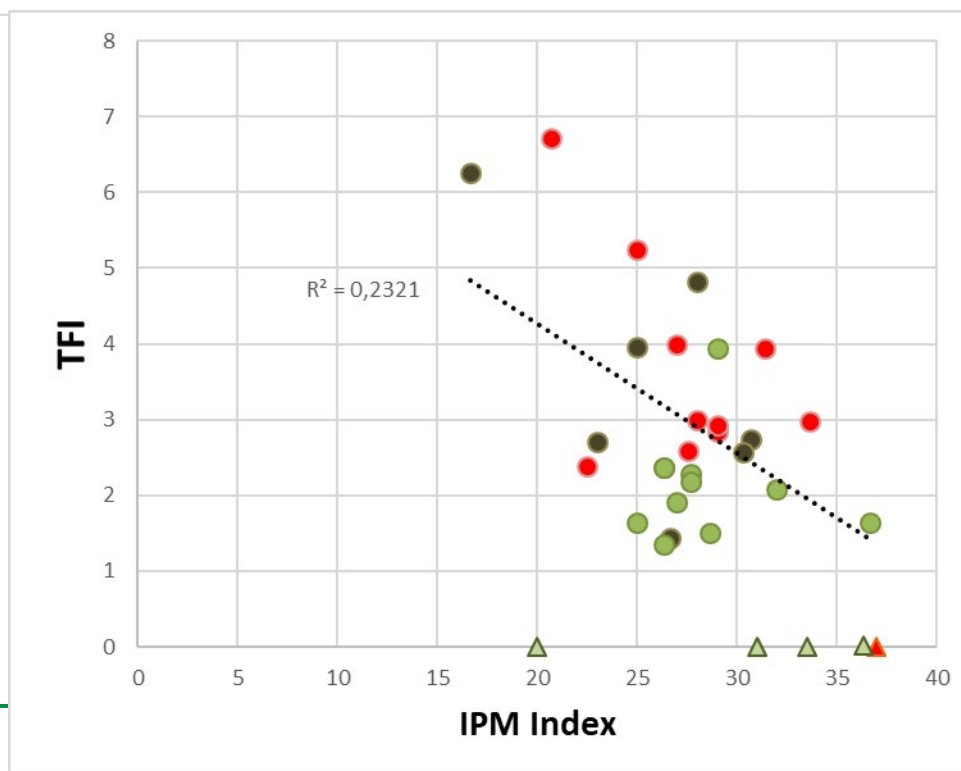
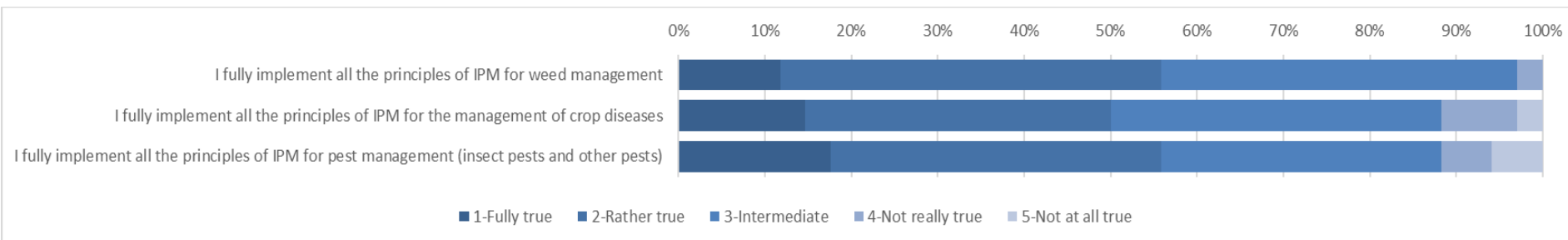
What is important for me ?



Is I clear to run one risk of this ?



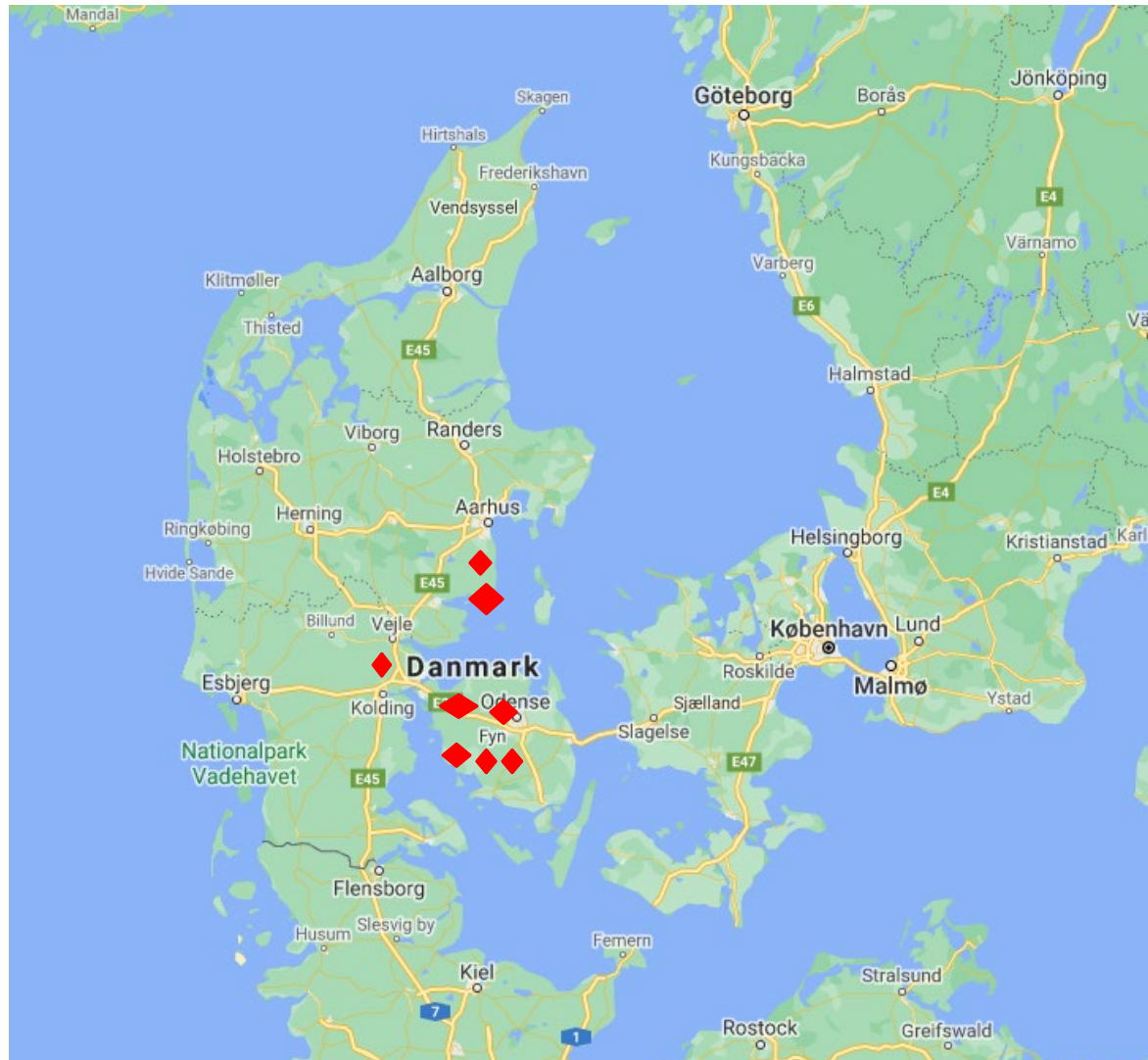
Using I all IPM measures ?



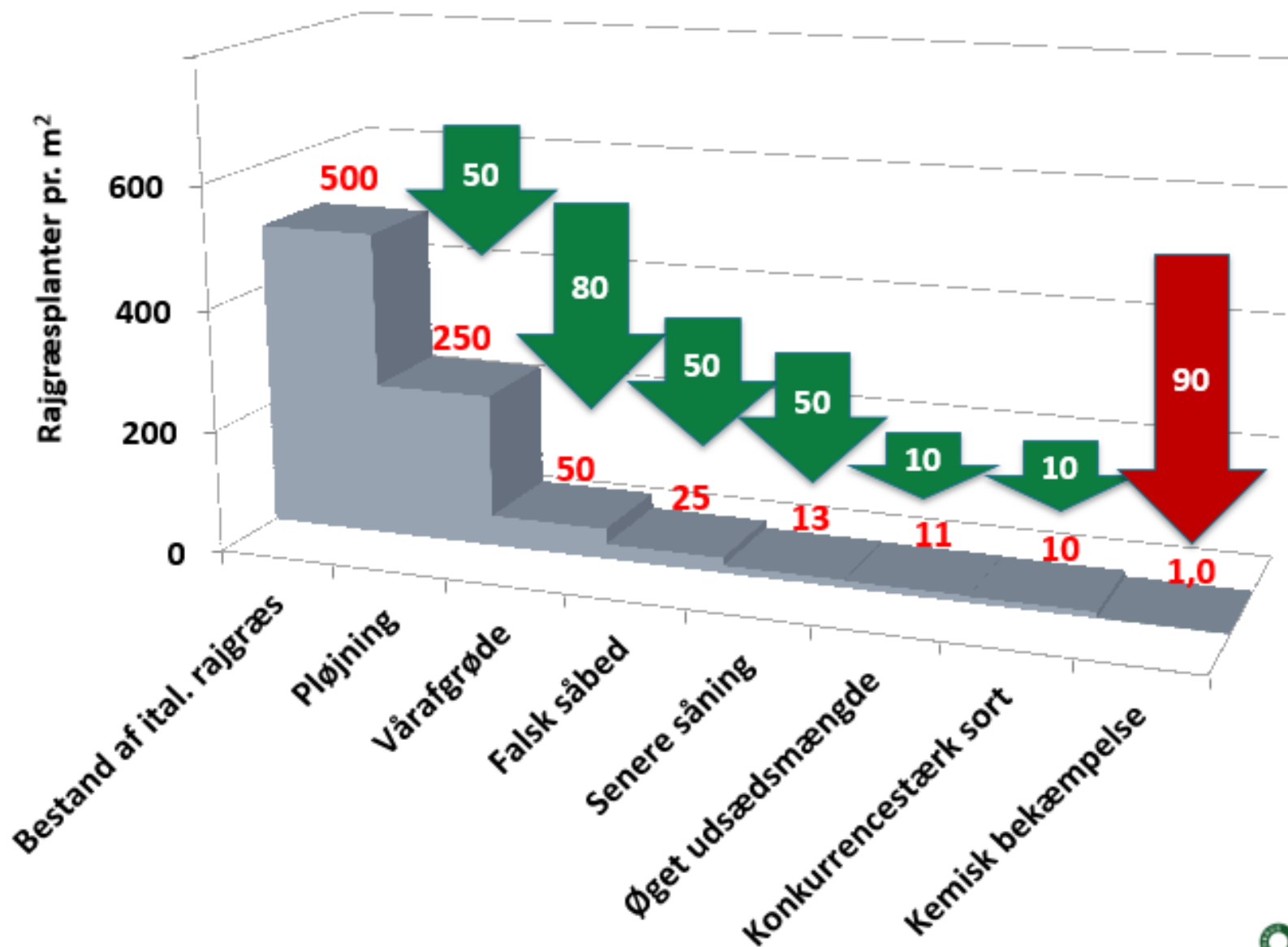
TFI: treatment index
Simple TFI: full dosage of product = 1 TFI



- ★ 8 farmers, 2 consultants
- ★ 1 individual meeting
- ★ 5 meetings in the field
- ★ 1 winter meeting with planning
- ★ 4 demos in the field
- ★ 1 joint meeting



INTEGRERET BEKÆMPELSE AF ITALIENSK RAJGRÆS



1. Establishment of follow-up crops in field with weasel tail w/w stump processing , w/w grooming
2. Spring barley with ploughing , sub-sowing of alfalfa in a field with a lot of Italian ryegrass
3. Rotational ploughing . Large parcels plowed and compared to unplowed field. In numbers. rye grass .
4. Establishment of follow-on crops with stubble harrowing after harvest .

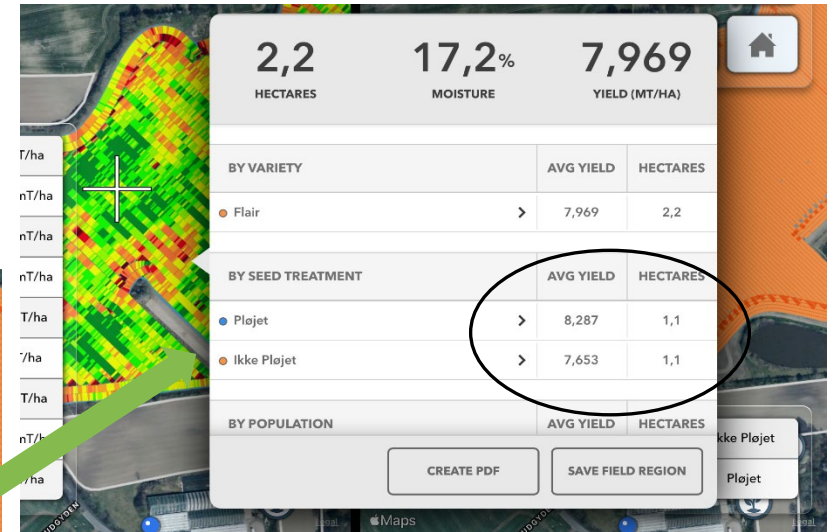
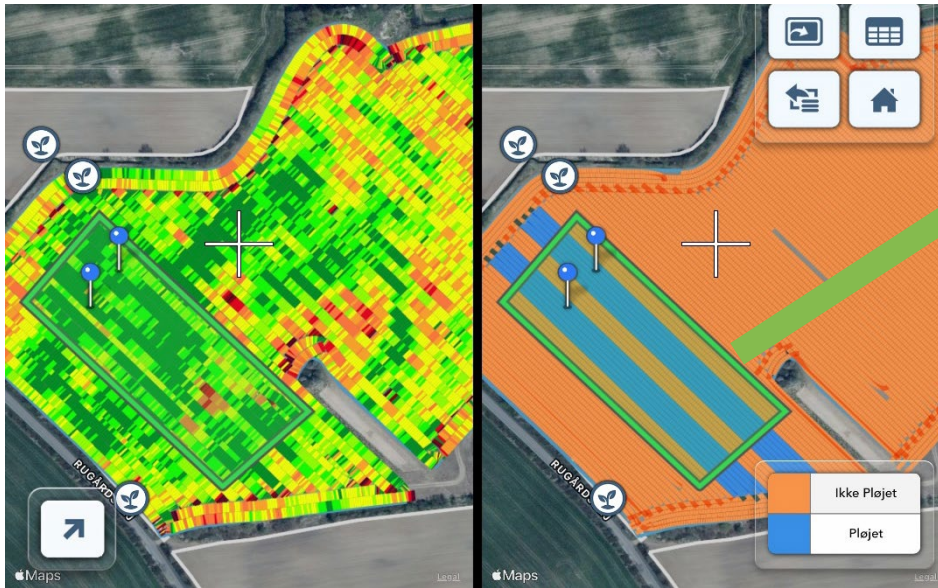
Photo from Sept 2021: establishment of follow-on crops In field with weasel tail.TV stubble harvesting . TH untouched stump



- ★ Unploughed field with ital . rye grass
- ★ 2022: spring barley sown on April 16. Harvested with FieldView , yield logging.
- ★ 2023: rape
- ★ 3 plots:
 1. Plowed every year
 2. Plowed year 1 and then no ploughing
 3. Plow-free as surrounding field



Analysis of the dividend in the area of experiment



Djursland Landboforening

IPMWorks the hub 20DL

13 farmers in the hub

2 consultants from the landboforeningen

Both demo events for the hub and for a larger audience

It was all Italian

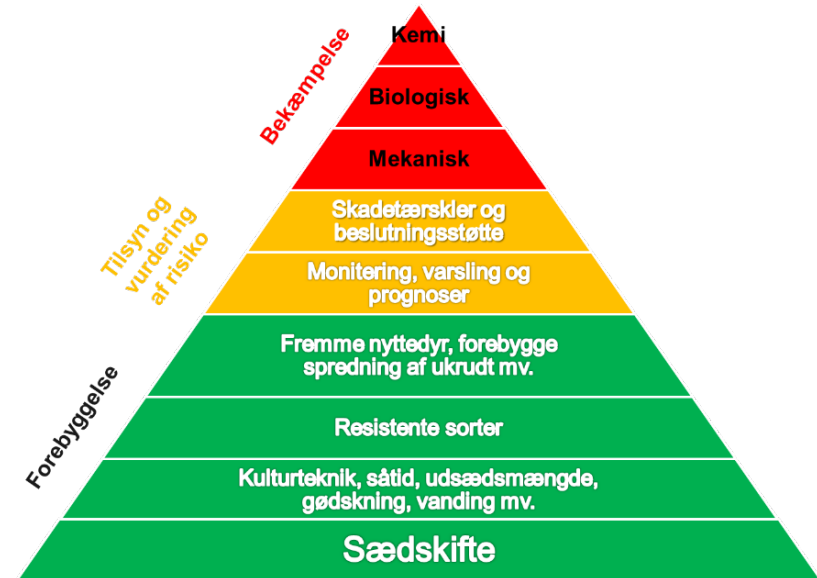
- Primary focus on Italian ryegrass this year



Other subjects



- Crop rotation
- Thresholds for pest spraying





Initiating the discussion on future cropping systems

How should future cultivation systems include IPM?

- Increased biodiversity in and around the cultivation areas
- A varied crop rotation with healthy varieties and more plant-based foods in the crop rotation
- Fertile soil, catch crops, reduction of nutrient loss.....
- Preventive measures in combating and greater focus on the life cycle of the perpetrators
- Precision technology and decision support
- Pesticides are still part of plant protection

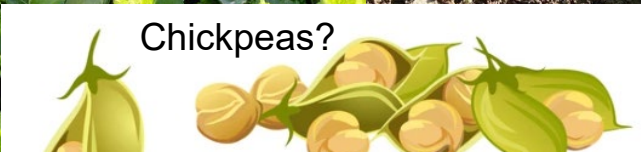
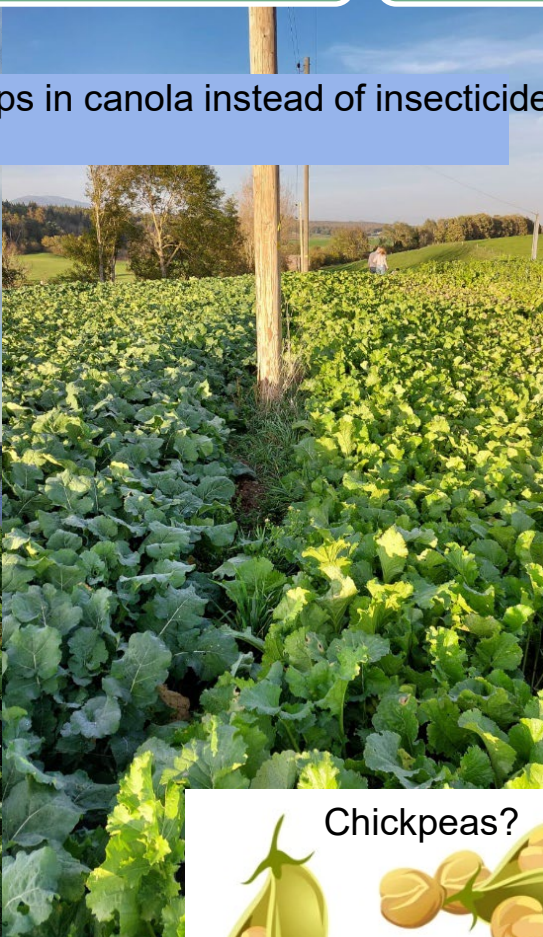
How should future cultivation systems include IPM?

15 minutes
Go together in pairs
Note 1-2 changes in cultivation practices that will promote IPM implementation

15 minutes
Find 1 other pair and discuss your ideas
Who will drive the development?

15 minutes
Common collection

Sub-sowing and border strips in canola instead of insecticides?
Monitoring and limit values



Chickpeas?



Limiting grass seed spreading with a top cutter?



Varietal mixtures against diseases and for increased weed competition

How can we best make ourselves less dependent on pesticides in the short term?



Plant breeding
with seed
production



Plant breeding
with fodder
production and
sales crops



CA or limited
tillage

- Concrete measures that can be implemented tomorrow
- Eg.
- Less use of glyphosate
 - Fewer treatments
 - Less consumption through targeted spraying