Exploring Opportunities for Joint Research in IPM

(WP2)

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WP2 – Objectives

- Map of pre-existing research at different levels in partner countries
- Share the outcomes of recent and ongoing research programmes
- Initiate detailed studies to assess which research areas have the potential to be shared across regions or countries
  - Aiming to speed up the implementation of IPM strategies at farm level and beyond their area of origin
- Develop recommendations for the common research agenda, identify and recommend opportunities for joint actions

Mapping & Analysis in C-IPM partner countries

Analysis of the current national context for research of IPM

- Major components of policy programmes, qualitative & quantitative goals
  (D2.1 First intermediate report on research and development)

➢ Findings

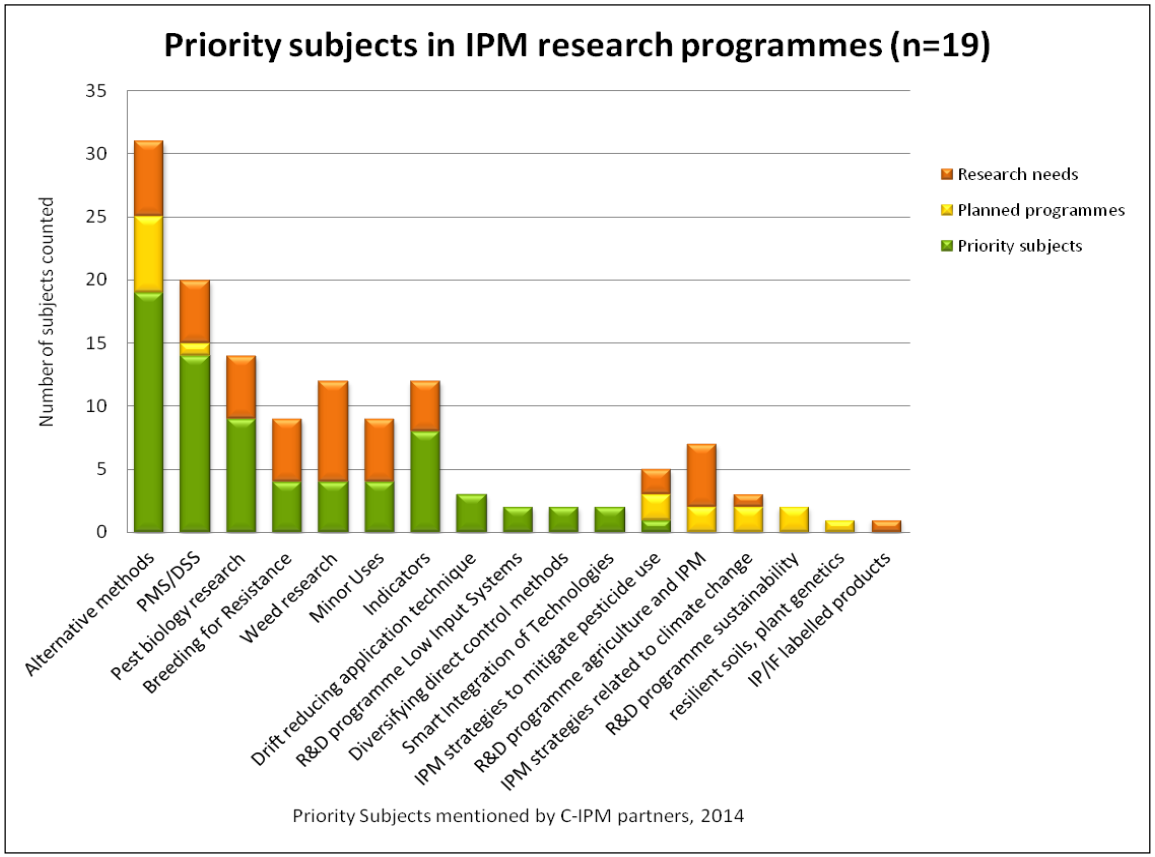
- ✓ Crop protection & IPM are pertinent on national policy agendas
- ✓ IPM research programmes tightly integrated to overarching policy framework of risk reduction

➢ Weaknesses, Gaps, Lacks

- Insufficient transfer and adoption of research results in practice
- Missing interfaces between needs and resources of farmers and research activities
- Organisational deficiencies in national research coordination
- Adaptation of prognosis models and DSS to different climate conditions
- Missing links and joint initiatives to promote awareness of consumers for IPM

Identification of national research priorities

Long term needs, collaboration opportunities, gaps



Main topics

- Biocontrol and non-chemical methods
- Pest Monitoring/Decision Support Systems
- Variety breeding, resistant varieties
- Research on prevention in IPM (crop rotation, cropping systems and weed management)
- IPM for minor uses

➢ In-depth studies
➢ Knowledge sharing workshops

In-depth studies & Knowledge sharing

Biocontrol and non-chemical methods

- ✓ Desk study (**D2.3**) and workshop (Report: Joint International WS on Biocontrol, 2016)

Pest Monitoring Systems and Decision support tools as research areas which benefit from cross-border collaboration

- ✓ Desk study (**D2.4** Report on IPM experiences and their applicability across Europe and a proposal for cooperation on selected topics)

Breeding for IPM: Variety breeding, resistant varieties

- ✓ Desk study (**D2.3**) and workshop (Report: Breeding for IPM in sustainable and low-input agricultural systems, 2016)

IPM for minor uses

- ✓ Desk study (**D3.2**) and workshop (Joint C-IPM and IOBC WS European agenda setting for research to cope with *Drosophila suzukii*, 2016)

Results - Biocontrol and non-chemical methods

Key challenges:

- Fundamental research is required to make biocontrol solution available for open-field crops
- Biocontrol solutions need to be integrated in the IPM approach
- Methods and formulation have to be further improved to ensure sufficient efficacy
- Improve readiness of farmers and demonstrate benefits of using biocontrol methods

Results - Biocontrol and non-chemical methods

- **Fundamental research is required to make biocontrol solution available for open-field crops**
  - Development and use of pheromone traps, entomopathogenic fungi, nematodes, and plant extracts needs enhanced efforts
  - New effective application techniques are missing for open field crops.
  - Fundamental research on new species and other occurring pests related to climate change
  - Development of methods for weed control including conservation biocontrol

- **Biocontrol solutions need to be integrated in the IPM approach**
  - Research to adapt existing cropping systems
  - Development, testing and application of biocontrol solutions in open field crops
  - Screening and testing of methods in field trials, long-term experiments to proof their efficacy

Results - Biocontrol and non-chemical methods

- **Methods and formulation have to be further improved to ensure sufficient efficacy**
  - Economical, large-scale production and formulation of biocontrol agents for a variety of climatic conditions, regions and cropping systems

- **Knowledge exchange to increase the efficiency of research and improve readiness of farmers**
  - Information sharing about field trials and research results
  - Demonstrate efficacy and benefits of biocontrol methods

- **Harmonisation and speed up of registration process in Europe**

Results - Areas which benefit from cross-border collaboration

Key challenges:

- Assessment of cultivar resistance and conservation of genes
- Collaborations concerning pesticide efficacy
- Determination of threshold levels
- Exchange and development on PMS/DSS

Results - Benefiting from cross-border collaboration

Key challenges:

- **Assessment of cultivar resistance and conservation of genes**
  - Characterisation of the strains, virulence, cultivar resistance breakdown, etc.

- **Determination of threshold levels**
  - Update of diverse models for pests and diseases using meta-models, which are ring-tested and validated
  - Research to re-evaluate and re-define threshold models with underlying fundamental research.

- **Collaborations concerning pesticide efficacy**
  - Monitoring pesticide resistance development
  - Harmonising sampling methods and genomic analysis

- **Exchange and development on PMS/DSS**
  - Set up of cross-border surveillance networks would be of great interest
  - Mapping of pest and diseases dissemination during season

Results - Breeding for IPM

Key challenges:

- **Co-design simultaneously breeding targets and IPM strategies as a holistic system**
  - Adapt plant breeding to crop rotation, crop diversification, etc.
  - Considerations of the varietal traits for resilient cropping systems to be integrated into agronomic practice
- **Breeding of resistant varieties for cropping systems and sectors**
  - Correct identification of resistance genes, list of cultivars using these genes
  - Work sharing in the evaluation of cultivars based on standardised protocols
- **Methods to ensure durable host resistance**
  - Deployment of partial resistance in combination with other tools to maintain the durability resistance
  - Adapt the use of pesticides to varietal resistance
- **Recognise new breeding technologies to support IPM**
  - Improve and adopt new breeding technologies (genome editing, cis-genesis)

Knowledge sharing

Demonstration Farms on IPM (and other forms of experience farms)

- Play a key role for development of tailor-made solutions with growers
- Close the gap between research and practical implementation of IPM
- Efficient instrument for knowledge sharing about IPM practices

Key elements:

- Dedicated demonstration farmers,
- Well-educated advisory services for IPM and
- Support-network among local farmers with similar cropping systems

Challenge:

- Long term projects/trials are needed to address adequately the technical as well as socio-economic issues and implementation of new technologies in practice

Summary

Future challenges are:

- Fundamental research on biocontrol tools and their integration to IPM Systems
- Co-design of varieties of plant breeding and cropping systems, crop diversification and intercropping
- Promote new breeding technologies
- All IPM aspects benefit from cross-border collaborations
- Multi-site studies across different countries reduce individual investments and proved large sets of testing conditions
- Demofarms actively support the implementation of new technologies in practice

There are many challenges and tasks ahead

C-IPM – C-IPM I – C-IPM II – C-IPM III …

Acknowledgements

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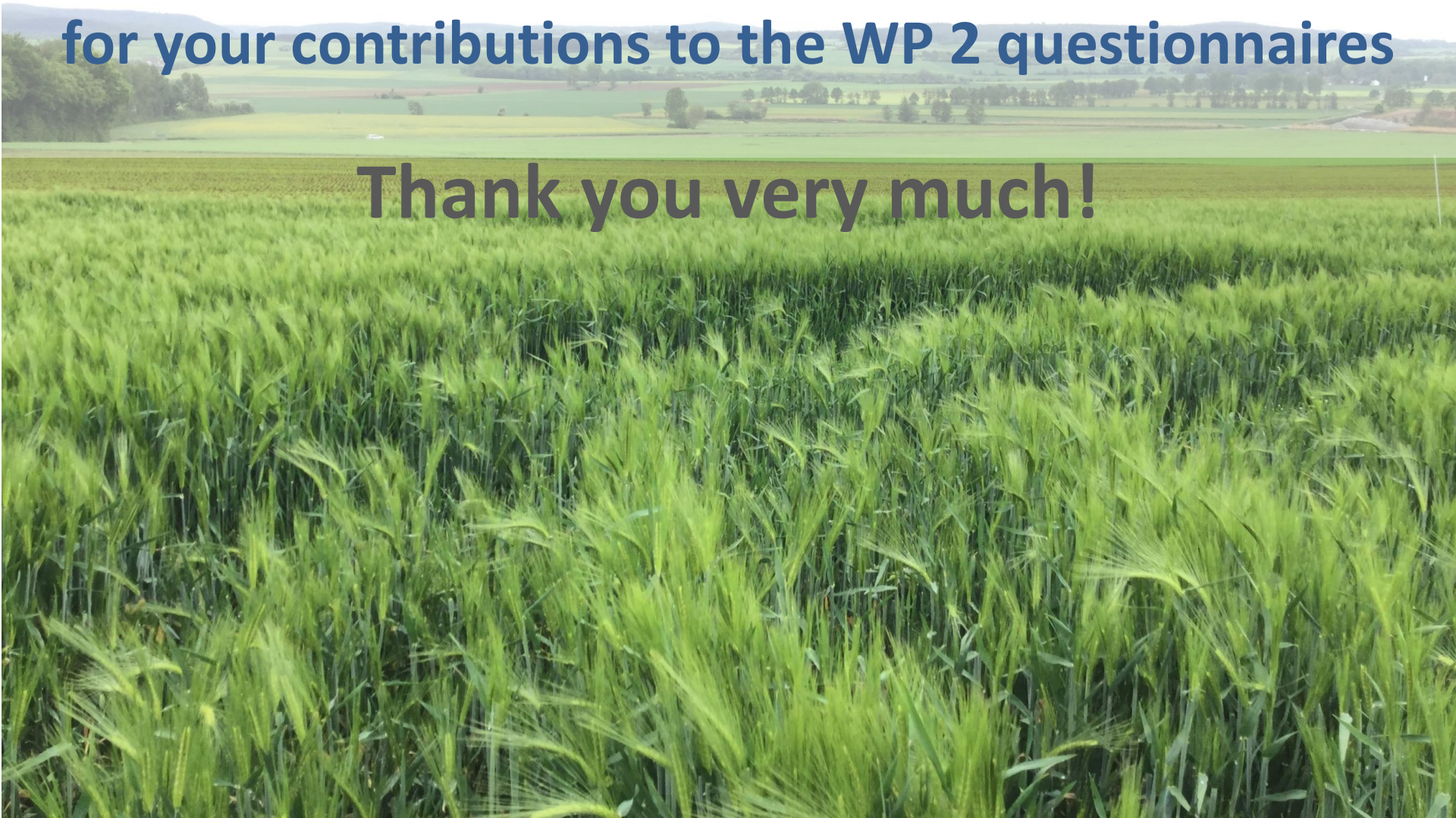

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