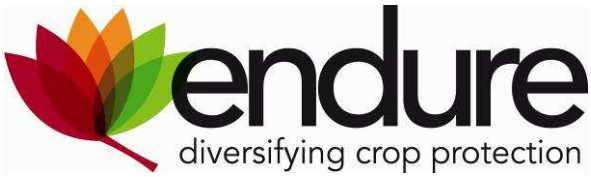

ENDURE

European Network for Durable Exploitation of crop protection strategies

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1 Conclusions

This section presents in brief the main conclusions made from the EPC survey of user needs. Please refer to the following chapters of the report to find detailed descriptions of background, methods and results.

1.1 General conclusions

The survey showed generally no big differences in answers between the participating countries. Whilst it was expected that there would be different needs among different target groups, the number of respondents in some of these groups are so low that it is difficult to draw conclusions about these expected differences.

The general conclusions may be summarized as follows:

- The long-term dreams/targets of the respondents may be grouped, and the grouping with decreasing priority is as follows: 1) promotion/adoption of IPM, 2) reducing pesticide inputs, 3) improved decision support systems (DSS) or improved use of DSS, and 4) use of resistant cultivars.
- Respondents state the following as the most important aspects of sustainable plant protection: low risk to human beings, low environmental impact, integrated crop management and the ability to generate farm profits.
- Food safety aspects (pesticide residues), environmental pollution and pesticide registration policy are seen as the main driving forces in the societal debate about pesticides and plant protection.
- Technical and economic uncertainty are seen as more important than institutional and social uncertainty in the adoption of new strategies in crop protection.
- Interviewees see knowledge about decision support systems (DSS), early warning systems, pesticide efficacy and environmental impact as the most useful short term (tactical) knowledge which could be provided by the EPC. When types of knowledge are grouped, knowledge regarding pesticide utilization is regarded most useful, followed by pest monitoring, alternative measures and environmental topics.
- The potential users were asked about innovation processes to bring their visions within reach. The responses to this open-ended question could roughly be grouped in descending priority as: 1) use of IPM (IPM/reducing use of pesticides, organic farming/non-chemical control, taxes for pesticide use and subsidising IPM), 2) pesticide utilization (harmonise pesticide legislation, safe production while ensuring income, use of pesticides with least side effects), 3) Pest monitoring (precision farming, DSS/monitoring), 4) Alternative measures (resistant cultivars, easy registration for biological products). Also, better education and use of GMOs were mentioned by several respondents.
- In the long term, expertise in resistant varieties and cultivars, non-chemical alternative measures, precision agriculture and genetically modified crops are also seen as valuable.
- Personal communication with advisers, scientific papers in English, internet-based information in English and professional articles in national magazines are seen as the most valuable information sources, although French interviewees rank information in English lower.
- The interviewees rank the following barriers to getting access to useful information as the most important: Missing summaries or missing main text in English and results that have to be translated to another context to be useful.
- The following features are listed as most important for the EPC: Generally easy to use, clear interface, efficient search method and summaries in English of all documents.

1.2 Conclusions regarding topics for plant protection in potatoes

The most important topics for crop protection in potatoes are listed below (see also page 10 and pages 69-71 for a more detailed listing of preferences):

- management of potato diseases in general
- management of late blight in particular
- pesticide application technology in potatoes
- non-chemical alternative measures
- pesticide resistance prevention
- decision support systems and monitoring systems regarding late blight

1.3 Conclusions regarding topics for plant protection in wheat

The most important topics for crop protection in wheat are listed below (see also page 11 and pages 72-74 for a more detailed listing of preferences):

- pesticide resistance prevention
- forecasting tools for wheat pests and diseases
- management of wheat diseases in general
- crop rotations to prevent problems
- decision support systems (DSS) regarding pesticides and dosages
- environmental impact of relevant pesticides

1.4 Conclusions regarding topics for plant protection in apples

The most important topics for crop protection in apples are listed below (see also page 11 and pages 75-77 for a more detailed listing of preferences):

- thresholds for pest/disease control
- management of apple diseases in general
- pesticide application technology
- decision support systems (DSS) regarding apple scab (*Venturia inaequalis*)
- management of pests in general
- pesticide residue levels

1.5 Recommendations for work on the EPC during the first 18 months

It is recommended that during the first 18 month, focus is set on advisers as a target group, because advisors are influential on the final decisions made by farmers, and the advisers are a useful source of information as well.

The analyses of uncertainties suggest that the work focuses on information which controls and decreases technical and economic uncertainty.

It is clear from the preferences of the users, that the collection of information should focus on decision support systems (DSS), early warning systems, pesticide efficacy and environmental impact. The preference for focus on DSS is interesting as this can help to translate general information into the context of the farmer.

The website does not have to be very sophisticated and fancy but simple, clear and efficient. Several potential users mention that just a few clicks to find relevant information is a must, and the service of the EPC should be free of charge.

1.6 Recommendations for EPC in long term

Low risk to human beings and the environment are seen as driving forces in the societal debate and funding of research. For further development of EPC we have to consider in what way we can

support this debate. This means in long term EPC must not only focus on farm advisors and the provision of decision support to farmers but also on providing decision support to policy makers and the behaviour of citizens and consumers.

The interaction between the EPC and policy making will be addressed in ENDURE SA4.5, but the indications from the potential users in the present survey suggest that improvement of decision support systems, a better involvement of advisers in decisions relating to plant protection, methods to prevent weed, disease and pest infestations, as well as focus on technical and economic improvements could be taken as input to SA4.5.

For the longer term developments of the EPC, it will probably be necessary to carry out a broader assessment of user needs, which should place more focus on the needs of potential users from Southern European and Eastern European countries. Furthermore, the assessment should be broader and not just focus on plant protection in potatoes.

However, the SA4 partners believe that the present results, conclusions and recommendations are satisfactory to set priorities for the work on the EPC for the next year and also to give good initial suggestions for further developments to the EPC after the first 18 months.

2 Introduction/Background

The ENDURE Spreading Activity 4 (SA4) aims at crating a European Pest Control Competence Centre (EPC).The ENDURE Description of Works states the following about the EPC: *"The overall objective of the European Pest Control Competence Centre (EPC) is to provide, for the first time, a central point of reference for extending recommendations and advice for end-users. It will draw on expertise available across Europe including all aspects of crop protection research and all major cropping systems. EPC will also create an overview of the ways crop protection policies are being developed and implemented in different countries and provide a central point of reference to policy makers in order to facilitate crop protection policies and implementation. EPC will also disseminate more general information on pest incidence, perceived new threats to European agriculture, and progress with research on new control tactics. During the first 18 months SA4 will:*

- *Assess the needs of user groups of the European Pest Control Competence Centre (EPC) using a quick scan among stakeholders, in particular advisory organisations and other stakeholders*
- *Develop a prototype structure for EPC with different interfaces for the various stakeholders. This will be realised in close cooperation with IA4 and based on user needs;*
- *Organise the supply of information to the EPC. In close cooperation with IA4 where information will be collected, EPC will translate and validate this information in 'ready-to-use' for the end user. EPC will mobilise the expertise of NoE members at the request of advisory bodies, or policy makers. Criteria for such a platform of experts will be formulated to assure that EPC will provide impartial advice, independent of any interest body.*
- *Design an appropriate framework for interaction between research and policy making to make the state of art in research and knowledge available to policy makers on demand and to help indicating knowledge gaps essential for implementation of ambitious crop protection policies."*

This report serves the purpose of fulfilling the first step towards the EPC, i.e. to assess the needs of user groups of the EPC.

The needs and ideas for the EPC should be useful in the *short term* (first 18 months of ENDURE) because they will form the basis for development of the virtual centre (website) with focus on the content and navigation used by advisors.

They may however also be useful in the *longer term* to develop a strategy and to extract ideas for the development of the EPC after the first 18 months when the EPC wants to develop into The Competence Centre for different stakeholders in Europe in the field of crop protection.

3 Methods

During the ENDURE kick-off meeting in Nice in February, the SA4 group agreed to use a questionnaire to formalise the interviews with potential users and stakeholders. The questionnaire was initiated by Jan Buurma (WUR) and Jens Erik Jensen (DAAS), and developed in close collaboration with the other partners in the SA4 group. A pilot questionnaire was tested with selected interviewees and was the basis of the final version. The final version of the questionnaire is shown on pages 13-21 of this report. The questionnaire contains a mixture of closed and open-ended questions. This was done in order to get broad input and clear priorities in answers. The

open-ended questions can be difficult to handle during analyses but nevertheless it was decided to include such questions as the results of the questionnaire may be of benefit for social analyses and the construction of so-called "belief systems" for the interviewees in another ENDURE activity, RA3.5.

Recruitment of interviewees was done by the national SA4 partners based on a proposed classification (researchers, advisors, etc). Appointments for interviews were made by telephone or e-mail communication.

As potatoes will be the first case crop of the EPC, some focus was on potatoes in the selection of interviewees, whilst maintaining a broad perspective on crop protection.

The English questionnaire was in some countries translated into the local language and sent to the interviewees for preparation. Then the interview took place face-to-face or via telephone. In general, the interviewer translated the answers obtained into English and reported answers using an internet version of the questionnaire implemented by use of the SurveyXact system (http://www.surveyxact.com/) with a built-in database. Some interviewees who were comfortable with the English language filled in the answers directly in SurveyXact without having discussion with an interviewer, but in those cases a thorough introduction to the aims and ideas of the questionnaire was given to the interviewees before the questionnaire was completed.

The database of SurveyXact permits export of data to e.g. Excel spreadsheets which was done prior to the analyses. The actual analyses were done by use of SAS (Statistical Analysis System ver. 9.1.3), using mainly the procedures MEANS, FREQ and TABULATE.

As the number of questionnaires is relatively small (66 in total), no formal statistical analyses were done. We believe that the stakeholders interviewed are representative of the future user groups of the EPC and that the results may help set the priorities of the EPC.

4 Results

All the results of analyses of the questionnaire are shown in the section entitled "Results from analyses of the questionnaire data (starting on page 22) of this report. This section will therefore only present the main results.

Table 1. The nine most valuable sources of tactic knowledge/expertise based on the survey. See the full listing in the tables on pages 48-51.

Q3.2 Tactical knowledge/expertise				
Type of knowledge or expertise	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
early warning and decision support tools	42	13.68	42	13.68
pesticide efficacy	36	11.73	78	25.41
environmental impact of pesticides	32	10.42	110	35.83
costs and benefits of pesticides	27	8.79	137	44.63

Q3.2 Tactical knowledge/expertise				
Type of knowledge or expertise	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
pest monitoring and detection tools	26	8.47	163	53.09
pesticides registered	25	8.14	188	61.24
non-chemical alternative measures	21	6.84	209	68.08
pesticide application technology	19	6.19	228	74.27
pesticide residue levels	10	3.26	238	77.52

Table 2. The nine most valuable currently used information sources. See the full listing in the tables on pages 57-58.

Q4.1 Most valuable information sources				
Source of information	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
pers. comm. advisers own country	46	18.25	46	18.25
scientific publ. English	35	13.89	81	32.14
internet English	32	12.70	113	44.84
magazines native lang.	26	10.32	139	55.16
national seminars	19	7.54	158	62.70
internet native lang.	17	6.75	175	69.44
magazines English	17	6.75	192	76.19
pers. comm. colleagues abroad	16	6.35	208	82.54
scientific publ. native lang.	15	5.95	223	88.49

Table 3. The six most important barriers for getting access to relevant information. The numbers indicate mean importance rated on a scale 1-5. See the full listing in the tables on pages 58-64.

Most important information barriers	**Mean importance**
Q4.2 missing summary in English	3.48
Q4.2 missing main text in English	3.26
Q4.2 results regarding irrelevant methods	2.98
Q4.2 cropping system different	2.94
Q4.2 results do not work in my climate	2.91
Q4.2 results do not address my context	2.85

Table 4. The five most important features of the EPC. The numbers indicate mean importance rated on a scale 1-5. See the full listing in the tables on pages 64-68.

Most important features of the EPC	Mean importance
Q4.3 generally easy to use	4.76
Q4.3 clear, structured interface	4.74
Q4.3 good, efficient search method	4.59
Q4.3 summaries in English	4.30
Q4.3 content in English	4.27

Table 5. The ten most important topics regarding crop protection in potatoes. See the full listing in the tables on pages 69-71.

Q5.1 Most important topics regarding potatoes				
Crop protection topic	Frequency	Percent	Cumulative Frequency	Cumulative Percent
mgmt. of diseases in general	23	8.36	23	8.36
mgmt. of late blight	23	8.36	46	16.73
pesticide application technology	18	6.55	83	30.18
non-chemical alternative measures	17	6.18	100	36.36
pesticide resistance prevention	17	6.18	117	42.55
DSS late blight	16	5.82	133	48.36
mgmt. of pests in general	16	5.82	149	54.18
monitoring late blight	16	5.82	165	60.00
resistance late blight	16	5.82	181	65.82
mgmt. of weeds in general	15	5.45	196	71.27

Table 6. The ten most important topics regarding crop protection in wheat. See the full listing in the tables on pages 72-74.

Q5.2 Most important topics regarding wheat				
Crop protection topic	Frequency	Percent	Cumulative Frequency	Cumulative Percent
pesticide resistance prevention	33	11.30	33	11.30
forecasting tools pests/diseases	28	9.59	61	20.89

Q5.2 Most important topics regarding wheat				
Crop protection topic	Frequency	Percent	Cumulative Frequency	Cumulative Percent
mgmt. diseases in general	28	9.59	89	30.48
crop rotations to prevent problems	21	7.19	110	37.67
DSS pesticides and dosages	19	6.51	129	44.18
env. impact of relevant pesticides	19	6.51	148	50.68
mgmt. weeds in general	17	5.82	165	56.51
pesticide application technology	17	5.82	182	62.33
thresholds for pest/disease control	15	5.14	197	67.47
mgmt. of Septoria	12	4.11	222	76.03

Table 7. The ten most important topics regarding crop protection in apples. See the full listing in the table on pages 75-78.

Q5.3 Most important topics regarding apples				
Crop protection topic	Frequency	Percent	Cumulative Frequency	Cumulative Percent
thresholds for pest/disease control	16	9.25	55	31.79
mgmt. diseases in general	12	6.94	67	38.73
pesticide application technology	12	6.94	79	45.66
DSS apple scab (Venturia inaequalis)	11	6.36	90	52.02
mgmt. pests in general	10	5.78	100	57.80
pesticide residue levels	10	5.78	110	63.58
forecasting tools for apple scab	9	5.20	119	68.79
env. impact of relevant pesticides	7	4.05	126	72.83
pesticide resistance prevention	7	4.05	133	76.88
crop mgmt. organic production	6	3.47	139	80.35

5 Discussion

As the questionnaire was used to provide responses from users/stakeholders from only France, The Netherlands, Germany, United Kingdom and Denmark, i.e. the countries that the SA4 partners represent, we cannot rule out that some bias towards “Western European preferences” have resulted. In particular it was clear that language preferences for the EPC were somewhat different in France than in the other countries. The French respondents rated French before English for communication via the EPC, and in some areas of France, Spanish rates higher than English. In Eastern Europe, there will probably be preferences for German before English. For the development of the EPC, there will not be enough resources for including summaries in all these languages, and therefore, we have recommended that all documents to be presented contain English summaries. If information providers have the time, it will also be possible to include summaries in other languages.

Another potential bias of the survey is that the number of stakeholders in the groups of "input suppliers", "interest groups", "government officers" and "traders/processors" are relatively low due to a low response rate. In other words, scientists, advisers and farmers have a high representation in the survey.

The SurveyXact system proved very efficient for collecting data from the survey, and several users have responded positively about the ease of use of the internet-based questionnaire.

It is fortunate that the results from the survey can be used for other activities in ENDURE, and in case other ENDURE partners wish to get insight, a full dataset may be obtained from the DAAS.

6 Questionnaire used for the survey

The text of the questionnaire that was used for the survey is shown below. It has been edited slightly to fit with the format of this report, but the text has not been changed.

SA4-survey "Needs of user groups"

Introduction

Hello, *NN*

May I ask for approximately 45 minutes of your time? I am contacting you because I participate in a European network of excellence named ENDURE (www.endure-network.eu). The aim of ENDURE is to diversify crop protection strategies and reduce reliance on pesticides.

One important task in this respect is the creation of an online platform called "European Pest Control Competence Centre (EPC)". The competence centre aims at collecting information on best practices in crop protection across Europe and to make the information readily available to various groups of end users. We realise that it is extremely important to learn about the needs of end users before starting building the competence centre.

I have called you because you represent a potential user group for the competence centre. We expect that each user has his or her own perspectives on crop protection and consequently his or her own needs/expectations with regard to the competence centre.

Therefore, we have created the following survey on needs and expectations. The survey questionnaire in English has been sent to you as a PDF file by e-mail *xxx* days ago. Have you received it, and are you willing to answer? The results of the questionnaire will be reported in an anonymous way.

Are you willing to take the interview now? As mentioned, it will take approximately 45 minutes. I will go through the questions together with you.

(Contact persons for the questionnaire and the survey: Jens Erik Jensen, jnj@landscentret.dk and Jan Buurma, jan.buurma@wur.nl)

6.1 Section 1 Drives and values

Personal

1.1 How are you (broadly speaking) involved in the domains of plant production and products in general and crop protection in particular?

Brief description of affiliation, position, profession, specialisation, etc. Only indicate 2-3 headlines.

1.2 In which of the following user groups do you classify yourself?
(reasoning from your affiliation; choose one single option)

- ☐ farmer
- ☐ contractor
- ☐ input supplier
- ☐ trader/processor
- ☐ government officer
- ☐ interest group
- ☐ farm advisor
- ☐ advisor for farm advisors
- ☐ researcher
- ☐ other, viz ……..

Objectives

1.3 What is your dream (target) of pest management i.e. crop protection strategies in your country in say 2015? In other words: how would you describe/characterise sustainable crop protection (reasoning from your professional position)?

Brief description of your dream/vision for crop protection. *Only indicate 2-3 headlines.* *(to be kept in mind for question 3)*

1.4 In your professional opinion, how do you rate the following aspects of sustainable crop protection, i.e. future crop protection strategies? (*column 1 = less important; column 3 = important; column 5 = very important*)

	1	2	3	4	5
low pesticide residue levels	☐	☐	☐	☐	☐
low pesticide use rates	☐	☐	☐	☐	☐
broad pesticide availability	☐	☐	☐	☐	☐
biological/mechanical control	☐	☐	☐	☐	☐
low environmental impact	☐	☐	☐	☐	☐
low risk to human beings	☐	☐	☐	☐	☐
high intrinsic resistance*	☐	☐	☐	☐	☐
nozzle design/application techniques	☐	☐	☐	☐	☐
integrated crop management	☐	☐	☐	☐	☐
functional agro-biodiversity	☐	☐	☐	☐	☐
early warning and monitoring systems	☐	☐	☐	☐	☐
decision support systems	☐	☐	☐	☐	☐
ability to generate farm profits	☐	☐	☐	☐	☐
elimination of infection sources	☐	☐	☐	☐	☐
user training at regular intervals	☐	☐	☐	☐	☐
other, viz ……..	☐	☐	☐	☐	☐

*Intrinsic resistance should be understood as the fact that the cropping system (crop rotation, variety choice etc.) is designed in such a way that a high degree of resistance towards weeds, diseases and pests is obtained.

6.2 Section 2 Innovation climate

Driving forces

2.1 The innovation process to sustainable crop protection is influenced by several technical, economical and socio-cultural forces. Which actual trends and developments (according to your perception) are feeding the societal debate on crop protection in your country? *(up to four answers possible)*

- ☐ food safety / pesticide residues
- ☐ production efficiency at farm level
- ☐ corporate social responsibility
- ☐ labour conditions for farm workers
- ☐ pesticide registration policy
- ☐ food scandals with pesticides
- ☐ environmental pollution by pesticides
- ☐ biological pest/disease control
- ☐ quality assurance schemes
- ☐ pesticide reduction action plans
- ☐ mechanical weed control
- ☐ pesticide availability for minor crops
- ☐ food security at global level
- ☐ organic agriculture
- ☐ decline in biodiversity
- ☐ conservation tillage
- ☐ others, viz ……..
- ☐ others, viz ……..

2.2 Can you explain how the trends and developments you ticked in the previous question stimulate or frustrate the innovation process towards sustainable crop protection? What is your own role in the innovation process? Which are your options to influence the course of the innovation process? Is time working with or against you?

Brief description of own role in innovation process   *(to be kept in mind for question 3)*

Most important uncertainties

Various uncertainties may hinder the adoption of new crop protection strategies in practice. We assume that there are four types of uncertainties, and in the following four questions, we would like to ask you how important you find these uncertainties.

2.3 How important is social uncertainty: do colleagues or trade/policy partners support new strategies? *(column 1 = less important; column 3 = important; column 5 = very important)*

	1	2	3	4	5
social uncertainty	☐	☐	☐	☐	☐

2.4 How important is technical uncertainty: does the technology or production system involved provide enough security? *(column 1 = less important; column 3 = important; column 5 = very important)*

	1	2	3	4	5
technical uncertainty	☐	☐	☐	☐	☐

2.5 How important is economic uncertainty: are crop yields and product qualities high enough to cover (additional) costs if inputs? *(column 1 = less important; column 3 = important; column 5 = very important)*

	1	2	3	4	5
economic uncertainty	☐	☐	☐	☐	☐

2.6 In your opinion, how important is institutional uncertainty: how sure is the applicability of rules, regulations, funds, contracts, etc.? *(column 1 = less important; column 3 = important; column 5 = very important)*

	1	2	3	4	5
institutional uncertainty	☐	☐	☐	☐	☐

2.7 Could you explain or illustrate with examples, why you classified the uncertainties in column 4 and column 5 of question 2.3 to 2.6 as the most important?

Brief explanation on classification of uncertainties *(to be kept in mind for question 3)*

6.3 Section 3 Targets and needs

In this chapter we try to get in touch with your reflections and actions on actual trends and developments with regard to crop protection, both for the short term developments (tactic track) and for the long term developments (strategic track).

Short term developments; current situation

The following two questions regard your potential actions and requirements for knowledge to **improve your current practices**, so it is important that you think about your present options when you answer these questions.

3.1 In chapter 2 you specified the strongest forces and most important uncertainties in the innovation process towards sustainable crop protection. How do you uphold (i.e. protect or defend) your interests in this context at the short term? Which actions do you have in mind to protect your interests?

Brief description of tactic intentions and actions

3.2 What type of knowledge or expertise (from European Crop Protection Competence Centre (EPC) or others) would you find most useful to support the short term improvement of your **current practices**? *(up tosix answers possible)*

- ☐ pesticides registered in different countries (dose rates, target pests etc.)
- ☐ pesticide efficacy (dose-response relationships, reduced dosages etc.)
- ☐ costs and benefits of pesticides

- ☐ pesticide application technology
- ☐ pesticide residue levels
- ☐ pesticide (biological) side effects
- ☐ environmental impact of pesticides
- ☐ pest monitoring and detection tools
- ☐ sampling plans for target organisms
- ☐ early warning and decision support tools
- ☐ green manures, trap crops, etc.
- ☐ pest/disease free planting materials
- ☐ biological pest/disease control measures
- ☐ non-chemical alternative measures
- ☐ mechanical weed control techniques
- ☐ protective clothing, safe working methods
- ☐ legislation on no-entry periods in other countries
- ☐ product stewardship in other countries
- ☐ tracing and tracking of pesticide sales
- ☐ descriptions of quality assurance schemes
- ☐ extrapolation of applications to minor crops
- ☐ others, viz …….
- ☐ others, viz …….

Long term developments; future situation

The following two questions regard your potential actions and requirements for knowledge to develop **your practices in the future**, so it is important that you think about your future options when you answer these questions.

3.3 In chapter 2 you specified the strongest forces and most important uncertainties in the innovation process towards sustainable crop protection. In chapter 1 you described your dream for crop protection in your country in 2015. What is your strategic vision (paradigma) to bridge the gap between "doom" and "dream"? Which innovation processes do you have in mind to bring your dream within reach?

Brief description of strategic targets and tools

3.4 What type of knowledge or expertise (from European Crop Protection Competence Centre (EPC) or others) do you find most useful to support the development of your **longer term** / **future practices**? *(up to six answers possible)*

- ☐ pesticide efficacy (dose-response relationships, reduced dosages etc.)
- ☐ costs and benefits of pesticides
- ☐ pesticide application technology
- ☐ pesticide residue levels
- ☐ pesticide (biological) side effects
- ☐ environmental impact of pesticides
- ☐ preventive crop rotations and husbandry practices
- ☐ resistant varieties/cultivars
- ☐ pest monitoring and detection tools
- ☐ sampling plans for target organisms
- ☐ early warning and decision support tools
- ☐ green manures, trap crops, etc.
- ☐ pest/disease free planting materials
- ☐ biological pest/disease control measures
- ☐ non-chemical alternative measures
- ☐ genetically modified crops

- ☐ mechanical weed control techniques
- ☐ innovation networks of farmers
- ☐ supply chain co-ordination
- ☐ precision agriculture
- ☐ review on effects of organic agriculture
- ☐ review on effects of functional agro-biodiversity
- ☐ examples of national pesticide action plans
- ☐ import/export flows of agricultural commodities
- ☐ innovative entrepreneurship
- ☐ elimination of infection sources
- ☐ social learning of stakeholders
- ☐ public private partnerships
- ☐ others, viz ……
- ☐ others, viz ……

6.4 Section 4 Current and future information management

Information sources

In the following questions, we would like to know about your current and future use of information on crop protection.

4.1 Which of the following sources of information are most valuable to you today?
(up to four answers possible)

- ☐ scientific reports/papers in your native language
- ☐ scientific reports/papers in English
- ☐ scientific reports/papers in other languages

- ☐ end-user oriented magazines/newsletters/pamphlets etc. in your native language
- ☐ end-user oriented magazines/newsletters/pamphlets etc. in English
- ☐ end-user oriented magazines/newsletters/pamphlets etc. in other languages

- ☐ information on the internet in your native language
- ☐ information on the internet in English
- ☐ information on the internet in other languages

- ☐ personal communication with colleagues/experts/advisers in your country
- ☐ personal communication with colleagues/experts/advisers abroad

- ☐ information on local training courses
- ☐ information on national seminars or conferences
- ☐ information on international seminars or conferences

- ☐ others, viz ……
- ☐ others, viz ……

Information barriers

4.2 Below you find a list of potential barriers for getting access to useful/appropriate information on crop protection, especially information originating outside your country. In your opinion, how important are the following potential barriers *(1 means not important at all and 5 means very important barrier)?*

	1	2	3	4	5
language barriers					
missing summary in my language	☐	☐	☐	☐	☐
missing main text in my language	☐	☐	☐	☐	☐
missing summary in English	☐	☐	☐	☐	☐
missing main text in English	☐	☐	☐	☐	☐

barriers related to accessibility					
I do not know of relevant sources	☐	☐	☐	☐	☐
I do not subscribe to sources	☐	☐	☐	☐	☐
I do not know relevant scientists	☐	☐	☐	☐	☐
I do not know relevant institutions	☐	☐	☐	☐	☐
barriers related to relevance					
results do not address my context	☐	☐	☐	☐	☐
results regard irrelevant methods	☐	☐	☐	☐	☐
results do not work in my climate	☐	☐	☐	☐	☐
cropping system different	☐	☐	☐	☐	☐
other barriers					
I have no time for internet searches	☐	☐	☐	☐	☐
I have no time to search databases	☐	☐	☐	☐	☐
my reading skills are limited	☐	☐	☐	☐	☐
others, viz ……	☐	☐	☐	☐	☐
others, viz ……	☐	☐	☐	☐	☐

Specific needs for EPC

The forthcoming European Pest Control Competence Centre (EPC) will be initiated as a website. Its focus will be to present in a structured way information that is ready to use in crop protection. Could you indicate how important you rate the following features? *(1 means not important at all and 5 means very important)*

	1	2	3	4	5
navigation, searching etc.					
generally easy to use	☐	☐	☐	☐	☐
clear, structured interface	☐	☐	☐	☐	☐
intuitive navigation	☐	☐	☐	☐	☐
good, efficient search method	☐	☐	☐	☐	☐
language of main navigation					
navigation in English	☐	☐	☐	☐	☐
navigation in my own language	☐	☐	☐	☐	☐
language of document summaries					
summaries in English	☐	☐	☐	☐	☐
summaries in my own language	☐	☐	☐	☐	☐
language of documents main text					
content in English	☐	☐	☐	☐	☐
content in my own language	☐	☐	☐	☐	☐
other features*					
others, viz ……	☐	☐	☐	☐	☐
others, viz ……	☐	☐	☐	☐	☐
others, viz ……	☐	☐	☐	☐	☐
others, viz ……	☐	☐	☐	☐	☐

6.5 Section 5 Practical start of EPC

The European Pest Control Competence Centre (EPC) will be stepwise developed. In the first phase (up to June 2008) activities will focus at three pilot crops: potatoes, wheat and apples, with the priority on potatoes which will serve at the model crop during the development phase.

5.1 What, in your professional opinion, are the most important crop protection topics to be covered by EPC with regard to **potatoes**?

(up to seven answers possible)

- ☐ not relevant for me, I am not dealing with potatoes or not interested in potatoes
- ☐ pesticide residue levels
- ☐ pesticide application technology
- ☐ environmental impact of relevant pesticides
- ☐ crop management in organic production
- ☐ pesticide resistance prevention and management
- ☐ thresholds for pest/disease control
- ☐ information on non-chemical alternative measures
- ☐ best practices for management of diseases in general
- ☐ best practices for management of pests in general
- ☐ best practices for management of weeds in general
- ☐ best practices for management of post harvest diseases in general
- ☐ best practices for management of aphids
- ☐ best practices for management of leafhoppers (*Empoasca* spp.)
- ☐ best practices for management of potato cyst nematodes
- ☐ best practices for management of couchgrass (*Elytrigia repens*)
- ☐ best practices for management of early blight (*Alternaria solani*)
- ☐ best practices for management of late blight (*Phytophthora infestans*)
- ☐ monitoring and forecasting tools for late blight (*Phytophthora infestans*) control
- ☐ decision support systems (DSS) for late blight (*Phytophthora infestans*) control
- ☐ development of cultivars resistant or tolerant to late blight (*Phytophthora infestans*)
- ☐ institutional tools for elimination of infection sources of late blight
- ☐ others, viz ……
- ☐ others, viz ……

5.2 What, in your professional opinion, are the most important crop protection topics to be covered by EPC with regard to **wheat**?

(up to seven answers possible)

- ☐ not relevant for me, I am not dealing with wheat or not interested in wheat
- ☐ pesticide residue levels
- ☐ pesticide application technology
- ☐ environmental impact of relevant pesticides
- ☐ crop management in organic production
- ☐ pesticide resistance prevention and management
- ☐ thresholds for pest/disease control
- ☐ decision support tools for selecting pesticides and dosages for a given problem
- ☐ monitoring and forecasting tools for pest and disease incidence
- ☐ scouting and mapping tools for weed infestations
- ☐ information on non-chemical alternative measures
- ☐ best practices on use of crop rotations to prevent weed, disease and pest problems
- ☐ best practices for management of diseases in general
- ☐ best practices for management of pests in general
- ☐ best practices for management of weeds in general
- ☐ best practices for management of *Septoria* diseases
- ☐ best practices for management of specific pest problems, e.g. aphids
- ☐ best practices for management of annual grass weeds
- ☐ best practices for management of perennial weeds, e.g. thistles, couchgrass (*Elytrigia repens*) etc.
- ☐ others, viz ……
- ☐ others, viz ……

5.3 What, in your professional opinion, are the most important crop protection topics to be covered by EPC with regard to **apples**?

(up to seven answers possible)

- ☐ not relevant, I am not dealing with apples or not interested in apples
- ☐ pesticide residue levels
- ☐ pesticide application technology
- ☐ environmental impact of relevant pesticides
- ☐ crop management in organic production
- ☐ pesticide resistance prevention and management
- ☐ thresholds for pest/disease control
- ☐ monitoring tools for codling moth (*Cydia pomonella*) or other pests
- ☐ forecasting tools for apple scab (*Venturia inaequalis*) or other diseases
- ☐ decision support systems for codling moth (*Cydia pomonella*) or other pests
- ☐ decision support systems for apple scab (*Venturia inaequalis*) or other diseases
- ☐ disease resistant apple varieties – and related strategies
- ☐ information on non-chemical alternative measures
- ☐ best practices for management of diseases in general
- ☐ best practices for management of pests in general
- ☐ best practices for management of weeds in general
- ☐ best practices for use of growth regulators (regulation of flowering, fruit set etc.)
- ☐ best practices for management of apple scab (*Venturia inaequalis*)
- ☐ best practices of management of Nectria canker (*Nectria galligena*)
- ☐ best practices of management of codling moth (*Cydia pomonella*)
- ☐ biological control methods in apples
- ☐ alternative methods for pest and weed control
- ☐ others, viz ……
- ☐ others, viz ……

6.6 Section 6 Winding up

Do you want to raise any other issues with regard to sustainable crop protection, the European Pest Control Competence Centre or ENDURE?

Other issues

The results of the survey will be analysed, compactly reported and subsequently used to adjust the content and the structure of EPC to the “needs of user groups”. To what extent are you interested in further involvement in the development process of EPC?

Interests in involvement

In case you wish to learn more about the outcome of the questionnaire, and in case we may contact you later on for testing and user feedback on specific parts of the EPC, then you are welcome to provide us with your address details below.

As mentioned in the introduction, your input will be treated in a total anonymous way, and we will guarantee you that you will in no case be able to track your specific reply to this questionnaire from any report that may be generated from it.

Person interviewed represents (country) ..... (Choose between UK, The Netherlands, Germany, France, Denmark, Other EU country)

Name of person interviewed: .....
Name of institution: .....

Mail address 1: .....
Mail address 2: .....
Mail address 3: .....
Postal code: .....
Town/City: .....
E-mail address: .....

Many thanks for your willingness to join the survey.

7 Results from analyses of the questionnaire data

All the results from the analyses of the stakeholder questionnaire regarding user needs for the European Pest Control Competence Centre (EPC) are presented below.

Answers for categorical questions are mainly summarized using one- and two-way tables as the number of questionnaires and the time available for reporting does not justify a more sophisticated presentation and analysis.

The full-length answers for the open questions are shown. No editing has been done, so language, spelling and grammatical errors are retained. Hopefully, the meaning is still quite clear. The order of individual answers is random.

8 General results

Number of returned questionnaires. A total of 66 complete questionnaires have been entered through SurveyXact into the underlying database.

Country				
Country	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
United Kingdom	16	24.24	16	24.24
Denmark	15	22.73	31	46.97
The Netherlands	14	21.21	45	68.18
France	11	16.67	56	84.85
Germany	10	15.15	66	100.00

9 Questionnaire Section 1 Drives and values

Q1.2
In which of the following user groups do you classify yourself?

The distribution is as follows:

Q1.2 User group				
Group	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
researcher	12	18.18	12	18.18

Q1.2 User group				
Group	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
advisor for farm advisors	10	15.15	22	33.33
others	10	15.15	32	48.48
farm advisor	9	13.64	41	62.12
farmer	9	13.64	50	75.76
input supplier	5	7.58	55	83.33
interest group	5	7.58	60	90.91
government officer	3	4.55	63	95.45
trader/processor	3	4.55	66	100.00

Q1.2
User groups for "others"

- Policy advisor
- contractor
- plant protection/seed industry
- Teacher
- levy board
- teacher
- specialist crop protection in a commercial trading organisation
- projectmanager endurable agriculture
- Projectleader, advisor
- Evaluator, specialist crop protection

Q1.3
What is your dream (target) of pest management i.e. crop protection strategies in your country in say 2015? In other words: how would you describe/characterise sustainable crop protection (reasoning from your professional position)?

Researchers (12):

- The main aim is a protection with reduced use of pesticides playing on all the tools already available, and try to optimize their interactions. Pesticides have to stay among the possibilities of protection, but with a strong development of decision making tools able to tell when a given pesticide is really needed
- My dream is that the use of chemical crop protection is very limited, new cultivars with high resistance to plant diseases and pest is widely used.
- Better tolerance from varieties to keep chemical products for heavy pressure from disease or pest.- More products from micro organism, easily to be used and with good control of pests and diseases.- Better knowledge about pests and environment information in fields (temperature, humidity ...).

- Minimal costs and minimal use of pesticides for crop protection by use of resistant varieties of cereals
- Organic plant production covers 15-20 % and IPM-based plant production covers the rest.
- In areas with impotatant ground water reservoirs we grow only organic. Sustainable includes the use of environmental friendly pesticides. Production is documented, controlled mainly by farmers own quality control systems but also via governmental control systems. Existing knowledge and monitoring is exploted in a better way than today via DSS, intelligent sensors, and local knowledge and observations.
- appliance of integrated plant protection in all areas of agriculture and horticulture
- IPM: growers only apply chemicals when indicated by decision support systems (DSS). So for all major diseases DSSes are available
- All our efforts should focus on integrated pest management
- Decrease dependance on chemicals and reduce pressure on the environment
- Acheive hig input crop yields with lower pesticides applied.

Advisor for farm advisors (10):

- I could dream of Phytophthora ifestans resistant varaities Better integrating of knowledge and practice
- Raisonnement des traitements / santé / produit / environnemental
- Further development of integrated pest management concerning details and transfer in practise
- That you only need to spray when you see problems in the field.I hope wee get some fungicide with eradicative efficacy.Wee need more safe chemicals and on toxic products Et will also bee helpful with weather forecast for at list 2 weeks, and more precisely and local weather forecasts. To day wee need to spray every week, because wee cant do anything, against late blight if wee come too late,
- My dream is that society and agriculture will find "common ground" in the sense that agriculture evaluates all available options when designing crop protection strategies and acknowledges the need for "natural patches and corridors" in a landscape dominated by agricultural activities, and on the other hand that the general public accepts that pesticides are used as much as necessary (but as little as possible) in order to secure quality and amount of the agricultural products.
- More focus on sustainability, which means that chemical control of weeds, diseases and pests will be more combined with crop rotation, cultivation etc.I also hope the breeding will be in progress, meaning that resistance against diseases can be more used than today. Especially in potatoes this could be a big step forward. Farmers have to be more skilled than they are today.
- It is my target to participate in the development and dessimination of decision support systems which can help the farmers on a sound foundation to minimise the use of pesticide in potatoes for the benefit of the farmers and the environment
- Optimize knowledge. Try to find a solution in integrated crop protection. Use and promote the usage of decision support systems.Broad pesticide availability
- 1. New varieties with a high resistance2. Large set of good chemicals3. Good skills of Farmers (good knowledge)4. Use of precision (GPS) weed killing
- To be able to make the winegrowers avoid applying useless treatments

Farm advisors (9):

- Products should be environmentally benign, but borad range of targets.
- To make a easy system, that every farmer can use in ctrl. of potato late blight
- Better control of late blight with less applications.Better detection/control of black leg.

- La mise en ?uvre d?une meilleure gestion des produits est en cours. Il est encore possible de réaliser des efforts supplémentaires en particulier sur le matériel de pulvérisation, la dangerosité des produits utilisés, et aussi sur les techniques alternatives au traitement.
- Réduction significative des ppp : protection intégrée (allongement rotation, variétés,?) : tendance lourde obligatoire pour tous les agriculteurs à différents niveauxPerte de solutionsQualité de l?eau
- sustainable crop production is production that is economic so the grower makes a return. S. C. protection allows him to do that and is a mixture of cultural and chemical methods. At the same time risk to environment is minimised but not eliminated.
- Aide aux agriculteurs (produits plus sains, meilleur cout, adaptation au marché)
- No limitation to production from pests. Greater reliance on seed dressings. Minimal over spraying.

Farmers (9):

- To use the minimum of of the most cost-effective effective products with good environmental profileTo be using plants with a better disease reistance rating, possibly GM
- I want to keep my crop free from weed pests and disease
-
- Good varietal resistance Advances in Seed treatment technology High yields
- Reduction of chemical inputs in agriculture to the absolute minimum in accordance with the principles of Integrated Plant Protection and Production.Use of advisory systems on the base of economical thresholds
- A workable reliable integrated IPM system with all aspects of IPM contributing successfully to a low input syatem with yields better than today's high input systems.
- Less use of agro chemicals more varietal resitance traits being used
- I want to be a farmer still
- broad varietal resistance to plant diseases, grass weed control that is 100% effective (and cheap!)

Input suppliers (5):

- Mutual recognition for crop protection products across Europe Uniform labels across Europe/ zonal registration Even safer for humans and environment
- crop protection/crop protection advice to be seen as a professional, well regulated business with the interests of crop production and environment fully integrated. Less tendency to knee jerk reactions over problems - both advice and understanding of why products used to become more science based.
- Sustainable crop protection is well understoood and practiced by the well informed. The dream is that UK farming becomes recognised as the benchmark in Europe for quality food production in sympathy with the environment. On a technological front I would like to see greater investment with properly managed and revelent research institutes to better understand simple issues of large impact e.g. disease eipdemiology & enhanced and innovative disease identification/forecasting to better target and simplify sprays.
- Safe,effective, sustainable, minimum environmental impact.
- Crop protection stategies that utilse products which have no environmental impact beyond the crop to which they are applied.Input availability and selection is science based. Consistency of farmer advice

Interest groups (5):

- have enough chemicals available, which are good for the environment

- My dream is that pesticides are only used, where they are needed to avoid substantial losses in yield and quality. The use of herbicides in kg/ha should be reduced by more than 90% by only spraying weeds, which is registrated by computer tecnology and exceeed the amount of weeds, that will not reduce the yield significant.
- Integrated Crop Protection with minimum use of plant protection products and maximum of biological control agents and methods.
- Chemical crop protection is accepted commonly by society, for the production of food and ornamental plant cultivation. For Nefyto low pesticide residue levels are no target. A product does meet the standard or it does not.
- The ideal situation is a more concerned effort to promote organic agriculture as a strategy for pesticide reduction and all the other benefits that follow this cultivation method

Government officers (3):

- Mu vision is that in the long run crop prtection should primarily based on preventive measures, non-chemical methods and only chemically as a last alternative. This requiers knowledge intensive strategies and high end IPM. This dream requires a mentality switch not only for farmers but all stakeholders in de production chain up to consumers who have to pay a reasonable price for this. The society as a whole is responsible.
- -größere Vielfalt an Prognose- / Diagnose- und Bekämpfungsmöglichkeiten für Landwirte und Gärtner einschließlich einer größeren Zahl praktikabler nicht-chemischer Methoden-klares rechtliches Umfeld bei Zulassung und Anwendung von Pflanzenschutzmitteln sow

- I think that chemicals cannot be avoided in plant protection in this time. Therefore it is necessary to perfect the process of its use. An important factor is the plant protection technique. It needs to be improved in its configuration (electronic) and in its use as well. The aim must be to reduce the amount of applied chemicals and to improve the quality of its application.

Trader/processors (3):

- As little as possible, as much as needed.
- Biological crop protection will get a market volume of 20 %.
- Dream: Be able to grow and store competitive (to current situation) quality raw material without crop protectants and regulators

Others (10):

- No problem with drinking water exist any more
- Effective ControlValue for moneyNot hazardous to enviroment
- A safe and environmental friendly production of all ag products- new chemistries to slove problematic diseases/weeds and meet the needs of the farmers- modern farming practices like precision farming are a common standard- broad plantings of GMO`s (herbicide and insect resistent crops are are more accepted in Europe), other stacks are in the market to produce industrial raw materiuals, pharmaceuticals, etc.
- Most measures in crop protection are standard use of chemicals. This should be changed into emergency measures. This should be reached by functional agro-diversity.
- ICM based primarily on host resistance (diseases, some pests) and effective agronomic strategies (weeds, pests and diseases). Effective pest/disease monitoring and warning systemsReduced pesticide use and effective strategies to combat resistance
- Capacité denrées saines
- A lot of the chemical crop protection these days can be seen as an insurance premium. This use of chemicals should be reduced. Allthough working for a commercial organisation I

believe it is in te interest of the farmer to develope and use detection tools more often. Is working on a new decision system on click beetle.

- Help to implement modern knowledge. Make knowledge available and spread it. The social surroundings nowadays makes too many people hesitate implementing innovations.
- In the ideal situation in 20015 all problems with the environment are solved.All solutions should be harmless to he environment. If this means a product is produced more expensive, the price on the market has to increase
- dream of integrated agriculture. For each problem the question should be:- can we solve the problem in a biological way- if no, can we handle it mechanical- if no, which chemical does the job and nothing more

Q1.4
In your professional opinion, how do you rate the following aspects of sustainable crop protection, i.e. future crop protection strategies?

Below data is presented with one table for each element

Q1.4 low pesticide residue levels				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	2	3.03	2	3.03
2	2	3.03	4	6.06
3	12	18.18	16	24.24
4	16	24.24	32	48.48
5	34	51.52	66	100.00

Q1.4 low pesticide use rates				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	6	9.09	6	9.09
2	13	19.70	19	28.79
3	18	27.27	37	56.06
4	13	19.70	50	75.76
5	16	24.24	66	100.00

Q1.4 broad pesticide availability

Importance	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	4	6.06	4	6.06
2	7	10.61	11	16.67
3	16	24.24	27	40.91
4	18	27.27	45	68.18
5	21	31.82	66	100.00

Q1.4 biological/mechanical control				
Importance	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	5	7.58	5	7.58
2	11	16.67	16	24.24
3	18	27.27	34	51.52
4	12	18.18	46	69.70
5	20	30.30	66	100.00

Q1.4 low environmental impact				
Importance	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	2	3.03	2	3.03
3	2	3.03	4	6.06
4	20	30.30	24	36.36
5	42	63.64	66	100.00

Q1.4 low risk to human beings				
Importance	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	2	3.03	2	3.03
3	4	6.06	6	9.09
4	10	15.15	16	24.24

Q1.4 low risk to human beings				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
5	50	75.76	66	100.00

Q1.4 high intrinsic resistance				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	2	3.03	2	3.03
2	1	1.52	3	4.55
3	15	22.73	18	27.27
4	16	24.24	34	51.52
5	32	48.48	66	100.00

Q1.4 nozzle design/application tech.				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
3	23	34.85	23	34.85
4	23	34.85	46	69.70
5	20	30.30	66	100.00

Q1.4 integrated crop management				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	1	1.52	1	1.52
2	3	4.55	4	6.06
3	11	16.67	15	22.73
4	13	19.70	28	42.42
5	38	57.58	66	100.00

Q1.4 functional agro-biodiversity

Importance	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	7	10.61	7	10.61
2	6	9.09	13	19.70
3	18	27.27	31	46.97
4	18	27.27	49	74.24
5	17	25.76	66	100.00

Q1.4 early warning and monitoring syst.				
Importance	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	1	1.52	1	1.52
2	3	4.55	4	6.06
3	11	16.67	15	22.73
4	29	43.94	44	66.67
5	22	33.33	66	100.00

Q1.4 decision support systems				
Importance	Frequency	Percent	Cumulative Frequency	Cumulative Percent
2	5	7.58	5	7.58
3	14	21.21	19	28.79
4	24	36.36	43	65.15
5	23	34.85	66	100.00

Q1.4 ability to generate farm profits				
Importance	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	1	1.52	1	1.52
2	4	6.06	5	7.58
3	8	12.12	13	19.70

Q1.4 ability to generate farm profits				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
4	18	27.27	31	46.97
5	35	53.03	66	100.00

Q1.4 elimination of infection sources				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	1	1.52	1	1.52
2	10	15.15	11	16.67
3	19	28.79	30	45.45
4	18	27.27	48	72.73
5	18	27.27	66	100.00

Q1.4 user training at regular intervals				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	3	4.55	3	4.55
2	5	7.58	8	12.12
3	25	37.88	33	50.00
4	15	22.73	48	72.73
5	18	27.27	66	100.00

The different questions of Q1.4 are summarized and ordered by descending mean importance in the following table.

Most important aspects of sustainable plant protection	Mean importance
Q1.4 low risk to human beings	4.61
Q1.4 low environmental impact	4.52
Q1.4 integrated crop management	4.27
Q1.4 ability to generate farm profits	4.24
Q1.4 low pesticide residue levels	4.18
Q1.4 high intrinsic resistance	4.14

Q1.4 early warning and monitoring syst.	4.03
Q1.4 decision support systems	3.98
Q1.4 nozzle design/application tech.	3.95
Q1.4 broad pesticide availability	3.68
Q1.4 elimination of infection sources	3.64
Q1.4 user training at regular intervals	3.61
Q1.4 functional agro-biodiversity	3.48
Q1.4 biological/mechanical control	3.47
Q1.4 low pesticide use rates	3.30

The following table shows the results of Q1.4. grouped by country. There are no major differences among the countries evident from the table.

	Country				
	Denmark	**France**	**Germany**	**The Netherlands**	**United Kingdom**
Q1.4 low pesticide residue levels	4.6	4.0	4.2	3.5	4.5
Q1.4 low pesticide use rates	3.4	3.1	3.5	3.3	3.3
Q1.4 broad pesticide availability	3.6	2.9	3.9	4.1	3.8
Q1.4 biological/mechanical control	3.5	3.9	3.0	3.6	3.3
Q1.4 low environmental impact	4.5	4.4	4.6	4.6	4.4
Q1.4 low risk to human beings	4.8	4.5	5.0	4.0	4.8
Q1.4 high intrinsic resistance	4.3	3.9	4.0	4.4	4.0
Q1.4 nozzle design/application tech.	3.7	3.7	4.1	4.3	3.9
Q1.4 integrated crop management	4.0	4.6	4.3	4.4	4.2
Q1.4 functional agro-biodiversity	3.1	3.5	3.7	3.3	3.8
Q1.4 early warning and monitoring syst.	4.3	4.1	4.4	3.9	3.6
Q1.4 decision support systems	4.1	4.3	4.2	4.3	3.3

	Country				
	Denmark	France	Germany	The Netherlands	United Kingdom
Q1.4 ability to generate farm profits	4.4	3.8	3.7	4.2	4.8
Q1.4 elimination of infection sources	4.1	3.5	3.0	4.3	3.2
Q1.4 user training at regular intervals	3.7	4.0	3.7	3.4	3.4

Q1.4
Other important elements of sustainable crop production

- good profit most important of all
- identification of resistant varieties
- low resistance risk pesticides
- None
- training of extension services at regular intervals
- variety choice and knowledge transfer to farmers

10 Questionnaire Section 2 – Innovation climate

Q2.1
The innovation process to sustainable crop protection is influenced by several technical, economical and socio-cultural forces. Which actual trends and developments (according to your perception) are feeding the societal debate on crop protection in your country?

The 255 answers are presented by descending importance.

Q2.1 Driving forces				
Driving force	Frequency	Percent	Cumulative Frequency	Cumulative Percent
food safety/pesticide residues	52	20.39	52	20.39
environmental pollution	38	14.90	90	35.29
pesticide registration policy	29	11.37	119	46.67
pesticide reduction action plans	21	8.24	140	54.90
organic agriculture	19	7.45	159	62.35
decline in biodiversity	17	6.67	176	69.02

Q2.1 Driving forces				
Driving force	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
food scandals with pesticides	14	5.49	190	74.51
production efficiency at farm level	13	5.10	203	79.61
food security at global level	12	4.71	215	84.31
quality assurance schemes	9	3.53	224	87.84
corporate social responsibility	8	3.14	232	90.98
pesticide availability for minor crops	8	3.14	240	94.12
others	7	2.75	247	96.86
biological pest/disease control	5	1.96	252	98.82
labour conditions for farm workers	2	0.78	254	99.61
conservation tillage	1	0.39	255	100.00

Q2.1
Other important driving forces

- climatic changes
- genetically modified organisms (GMOs)
- GMO
- santé agriculteur
- the traders want healthy potatoes
- unthought anxiety of a declining society which is against many innovations per principe
- we get more late bligt early in season

Q2.2
Can you explain how the trends and developments you ticked in the previous question stimulate or frustrate the innovation process towards sustainable crop protection? What is your own role in the innovation process? Which are your options to influence the course of the innovation process? Is time working with or against you?

Researchers (12):

- Our role is mainly to test new innovations and try to define when they are interesting or for the farmers and the production, taking into account economic but also environmental and social aspects. Our work is impossible if there is systematically unacceptance for the innovation from the society and if politicians are always afraid of a possible reaction of the citizen
- Greater interest in organic farming i generalNature loose a large numbers of all kinds of animals (insects bird etc.)Teh has been some food safety problems

- Since 2004, we develop an online decision support system to reason and reduce the fungicides treatments against late blight (Mildi-LIS®). The process of sustainable potato crop protection is going step by step...
- The heavy pressures on chemical products suppress one way of innovation.- The high cost of registration process (high demand of tox and ecotox information) is against new micro organism products studied by start-up or researcher. It is more and more difficult and longer and longer to test micro organism in field conditions at farmer level.- Time is working against farm productivity due to no commons rules. Products forbidden in my country are used in country around. - Why do you produce safer food (on residue issue) if you import uncontrolled or bad cheaper food from outside.- Organic agriculture is an interested issue because you have to take into account the yield difference. How to manage this decrease of production
- Developments stimulate the decrease of use of pesticides and responsible use of pesticides and development of 'better (more safe)' pesticides.My role in this proces is to do research to these developments, to implement this in research projects and to inform farmers (study clubs) and intermediars about newest developments and results.For this i make use of our research station and experimental farms.At this moment the financial sources for this kind of research are decreasing year by year.
- The trends forces the farmers to focus on reduction and replacement of pesticides. As researchers we develop new non-pesticide or IPM solutions. Influnece thropugh good research results and a quick communication to the agriculture advisory system. time is working against public economical supprot to agricultural research and behavioural regulating pesticide taxes are a head.
- We have pesticide action plan, but goals on pesticide reduction are not reached in time. Change in biology and climate change increase the need for pesticide control for some pathogens. Resistance is not the major focus point in breeding (compared to other quality traits and yield). In high value crops consumers choice of cultivars decide growers choice of cultivars. Organic production is increasing and also the quality of organic products. Organic growers becomes more "professional". In my research area about development of DSS we have very good options to influence the innovation process. Earlier we never asked the users what they wanted! We do now. DSS has to be integrated with extension initiatives on all evels. If not advisors will not support DSS's developed by Applied research institutes and other Institutions.
- food scandals with pesticides and discussion about food safety led in the past to a denegation of pesticide use in general and to a favouritism of organic farming but not of integrated plant protection
- GMOs: resistant cvs need less input but there is still a lot of debate about safety of use of GMOs. In potatoes we are involved in research project to test resistance of GMO cvs.Organic: methods developed for organic can also be of use for IPM. Untreated (organic)crops can also be a source of infection for conventional neighbouring crops. In potatoes and onions we are involved in research projects to find organic methods to control diseases and we are also involved in discussions between organic and conventional growers.Pesticide registration policy: registration status in NL is unclear in relation to EU rules. Uncertainty of chemicals will be available for growers.Food safety: can imply chemicals and mycotoxins in food. Is important issue for consumers. We are involved in project to reduce mycotoxin levels in cereals.
- Plant protection has to be economically and ecologically justified both can either stimulate or frustrate the innovation.As a role in the innovation process I find the definition of the necessary minimum of applied pesticides very important.

- Safety of food; is driven by fear (undeservedly)Registration Policy; playzone for several organisationsBiologic produce: hot item, does not get attention of the publicreducing chemical uss; stimulates innovation.my role: stimulate the use of integrated strategies
- Pesticide residues do not necessarily mean a food/health risk - this should be sensibly monitored. Products should not be banned just beacuse they are detectable.Biodiversity often seems to be quantified by number of brid species. It should be more than this.

Advisor for farm advisors (10):

- Give sustainable advise Prevent use of chemicals in a way that will give reasons to criticism
- réglementation forte
- To insure planning security in firms with innovate research as a member of the registration board
- I think wee do very little in Denmark. I think it is the big companies and big countries deciding whit?s way to go. I thing our influence is very limited
- The public buys cheap foods (produced outside Denmark) while demanding "sophisticated" low-input production within Denmark. The demands for low pesticide use are not related to any risk assessments regarding pesticide use, instead the actual sales are used as a measure of environmental load. This i frustrating. My role is to help implement reduction goals that do not always make any sense for the environment. It would in my opinion be better to focus on unsprayed buffer zones along sensitive natural areas and safe handling of pesticides rather than focusing on reduction of use rates that area already low.
- Research has very much focus on health and environment, and less focus on developing new more environmental friendly ways to protect the crops. There seems not to be willingness to spend more funds for innovation of new crop protection strategies and methods.
- Participate in the development of new early warning and decision support systems and document the cost/benefit of these system.
- opponents of chemicals run a manhunt on chemicals, that is why retailer demand even lower residu-levels, this is frustrating.Nederland often is running ahead of the EU, resulting in a slower authorisation.Some chemicals which are not used anymore can still be found in water. This fact is slowing down the autorisation of new chemicals; nce a thief, always a thief "biodiversity s a non-issue. The dutch landscape is completely artificial, biodiversity is a nice issue for civiliansbut has no practical use for farmers"
- The control on the use of chemicals is frustrating. The control is pointed at the text of the label in stead of good practice considering the environment. (For instance the use of less chemical in potatoes is forbidden because of the label does not mention the possibility)The law on crop protection does not support innovationgrowers of minor crops are forced to illegal use of chemicals. Often innovations fail because the crop is not profitable enough
- Innovation processes are enforced both by the consumers (mainly by the food assurance processes more and more required by sellers) and on the other hand by pesticide registration policies. Winegrowers are in between these two types of constrains. We are trying to accompany these evolutions and to find solutions for them. Time is working with us because there is so many to be done and we are not yet technically sure of the solutions we suggest them to apply!

Farm advisors (9):

- Try to reduce diffuse pollution of agricultureUse soil management plansThere must be a strong interaction between farm and environment.

- Trying to help farmers use the best pesticides in lowest possible quantities.Having access to the best pesticides.To keep the environmental inpact on a low level and still produce efficiently.
- Frote presssion nécessaire notamment réglementaire, références manquantes pour développer des alternatives.
- Mon rôle est d?accompagner les viticulteurs vers de meilleurs pratiques phytosanitaires, pour protéger leur santé ainsi que l?environnement. Je ne fais pas d?expérimentation mais donne de l?information sur les innovations par exemple. Nous avons un rôle de relais entre les instituts techniques, l?administration et la profession
- the frustration is the lack of understanding of issues within the general public which leads to political decisions that are knee jerk reactions which can overtake the innovative process that needs time to develop.
- The measurement of very low levels of pesticdes in the environment or food are leading to the withdrawal of good cost effective products from the market. If sustainability encompasses profittability, this is not helping to arrest the decline in global grain stocks. We are lobbying for reconsideration on the regitration of some products.

Farmers (9):

- I must take the options that government gives me. But I want to be able to compete with my colleagues in eu and outside eu.
- minority pressure groups are listened to by policy formers. anyproposals with production or profit objectives are sidelined at anearly stage in the debate. no consideration of anything that does not have environment at itscentre is considered as a way forward. Only food crises will address this inbalance .
- Food scares and food food safety is very important but correct science needs to be applied to decision making.Some decisions are being based on political wins, not science.
- In the moment there is no real innovation process towards sustainable crop protection. Agricultural practice is strong influenced by orders of the government and the EU. There must be a political will to influence the course of the innovation process.
- Emotive issues of food safety are frustrating the development process of sustainable crop protection. None
- food safety is now becoming more important and recieving more media coverage tahn before, growers need to be seen to be making every effort to address pesticide levels in food. technolgy in plant breeding is not moving fast enough to allow a reduction in the use of pesticides.
- I do not understand this.
- Frustrate: water quality standards mean that high a.i/Ha chemistry (which may or may not be multisite) is abandonned in favour of high specific activity products -these appear to be easily overcome by adaptaive changes in the target organisms.Residual products which may be high a.i per hectare may be abandonned in favour of more contact products in the spring (eg BLW &sulphonyl ureas) very little escapes such products leading to a decline in diversity in the field.StimulateThe decline in biodiversity might stimulate the developement of entirely computerised (machine vision) methods of acheiving selectivity between crop and weeds (and between weed species) such a system might require no herbicide whatsoever. Research into this approach would not otherwise be funded as it is not in the interest of the major present investors in weed control research -the herbicide manufacturers

Input suppliers (5):

- To develop and market safe and efficient crop protection products to increase and secure production efficiency on farm Overcome frustrating hurdles related to national regulatory process Offensive and proactive communication about increasing importance of agriculture/crop protection to secure demand for food and energy
- changes in registration status can reduce access to useful actives eg trifluralin and potentially, due to lack of other options force people towards less effective/more environmentally unsustainable options. Often seems to be a lack of joined up thinking between govt departments - and at times within food processors/supermarkets
- Poor image of farming/use of crop protection products, and government policy does not widely support this industry for innovation. There are no new researchers who are truly innovative and in touch with UK farming plc. It requires a particular skill to transfer knowledge from field to lab and back again. Current researchers have, in my view become complacent in unchallneged environments and entrenched in views which have not changed over time or volved withthe market. Time is also of the essence, as even 3 year projects are difficult to justify in a rapidly evolving market.
- No specific role in innovation process per se, rely on opportunities to feedback to R&D manufacturers of crop protection products and plant breeders re desirable traits for their "products".
- Pesticide registration systems are unreaonably slow and more and more often utilise non-science based decision making processes. residues in food are a perception issue not helped as Supermarkets try to gain commercial advantage by using slogans such as "residue free" - which is impossible. The biggest problem is that sustainable agriculture should be science based whereas food consumption and environmental perceptions tend to be emotionally based.

Interest groups (5):

- On the global scale, Nederland has lot of small crops, just four big crops. Innovation has to be stimulated.
- The results from pesticide reduction action plans in Denmark stimulate the innovation process towards sustainable crop protection, but organic agriculture, means that many people don't focus on the pesticide use in conventionel farming. My options is to focus on the pesticide use reduction plans and the opportunities to use new tecnology to reduce the pesticide use.
- Food safety aspects and scandals stimulate innovation processes towards acceptance of quality assurance schemes. Unfortunately there is still a strong reluctance of users to recognize assurance schemes as improvement factors.We are supporting innovation processes by offering scientific fora for emotion free and objective exchange of facts and experiences with plant protection methods. Time is no real relevant parameter for these activities. If assumed as relevant, time is favoring innovation.
- Lobby on a quick authorization of new chemicals. Obtaining an authorization costs a lot of money. Nowadays a fund exists to obtain authorization for minor crops. Each crop does have a coordinator to deal with the legitimation of chemicals.
- Our organisation is heavily involved in the political aspects of pesticide use. We contribute to the process of making it more attractive to reduce pesticide application through participation in i.e. pesticide reduction action plans. No doubt, the farming community would not of it's own volition reduce its pesticide consumption.

Government officers (3):

- Knowledge dissimination on IPM and new strategies is curical and not always easy to get results. All stakeholders should be interested and support teh idea of IPM and comsumers

shoudl be aware of it. Long term funding for research and dissimination is needed to reach the goals.

- - Beteiligung an der Formulierung rechtlicher Rahmenbedigungen- Verantwortlich für Umsetzung rechtlicher Vorschriften einschließlich deren Kontrollen- Fördergeber für Zulassungsversuche für minor crops
- The trends I ticked in question 2.1 make that the society debate is especially directed on the problems and not on possible tasks to develop solutions. This debate stimulates the innovation in plant protection by keeping in mind the problems. But the expression ?plant protection? is connected with a negative touch. The society tends towards the abolishment of plant protection with chemicals without keeping in mind the negative effects on feeding and that frustrates the innovation process. My role is to improve the application process and to avoid negative influence on environment caused by the sprayers. My aim is to improve the reputation of chemical plant protection process. I think that time works with me.

Trader/processors (3):

- Debate is based on emotions, not facts. A world wide approach on securing enough food for all is not existing.
- The time is working for us
- GMO is a good example: probably good GMO to be developed to less rely on pesticides, but reluctance from consumers frustrates innovation process and development. Food scandals with pesticides (residues of old pesticides (not anymore registered in Western Europe)) and environmental pollution stimulate agrochemical companies to launch on the market better profile products. These products, generally more expensive, aren?t widely used if they only add an ?environmental advantage? because of the economical pressure (production cost at farm level).Our role looks quite limited in the innovation process. Competition between (agrochemical) companies looks the best engine of the innovation process

Others (10):

- Vewin discovers a problem with waterquality (mostly herbicides). Vewin mentions the problem to the other stakeholders. Time usually is a disadvantage, residu in drinking water is to blame to chemicals which were used in the past. Sometimes the chemical is forbidden in the meantime, but can still cause trouble for several years
- end user require justification for application
- In the public food safety is under discussion and as a consequence there is a trend towards organic farming.- The registration process of new chemistries across the EU plus diferences between the countries should be more harmonized.- Pesticide reduction programmes should consider a higher risk to get resistence- Wheather extremes are more and more influencing farming MY role: development/support of new technologies like conservation tillage and GMO crops.
- I have no role.Now cost price has to much influence, it blocks innovations. A new chemical or method often is more expensive, therefore farmers will keeping using the old methods. The registration policy on non-chemical measures (herbs) is unclear
- Societal concern/interest is focused around food safety and environmental issues -chemical inputs (and GM) are seen as undesirable by many people, there is little concern about efficient production or food security. HGCA provides information based on sound science and is currenlty getting more involved in public awareness and understanding of farming (for example, through the LEAF Open Farm Sunday events)
- problem with the question; these are 4 questions.Innovation (meaning the introduction of new chemicals) will help you reach your goals because the new chemicals are

improvements for the environment.One should combine practical en economical aspects of all practices

- My own role is to help innovate and implementate. Growers of small crops are forced to innovate because they cannot use enough chemicals (legally). In the end this problem helps them to be the first to solve the problem without chemicals. GMO's can play an important role in reducing diseases, it should be species-own genes.
- The Legislation regarding to pollution has become more strict.Food scandals helped forcing innovations. The retailers had to introduce certificates
- The pointed issues frustrate innovation. Scandals use up valuable research-time which could have been spent better on fundamental research.EurepGAP is sometimes used in a too strict way,... farmers who use less chemical have got a penalty for not following the prescription.

Q2.3
How important is social uncertainty: do colleagues or trade/policy partners support new strategies?

Q2.3 Social uncertainty				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	7	10.61	7	10.61
2	15	22.73	22	33.33
3	17	25.76	39	59.09
4	13	19.70	52	78.79
5	14	21.21	66	100.00

Q2.4
How important is technical uncertainty: does the technology or production system involved provide enough security?

Q2.4 Technical uncertainty				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	1	1.52	1	1.52
2	6	9.09	7	10.61
3	19	28.79	26	39.39
4	17	25.76	43	65.15
5	23	34.85	66	100.00

Q2.5
How important is economic uncertainty: are crop yields and product qualities high enough to cover (additional) costs if inputs?

Q2.5 Economic uncertainty				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
2	3	4.55	3	4.55
3	13	19.70	16	24.24
4	17	25.76	33	50.00
5	33	50.00	66	100.00

Q2.6
How important is institutional uncertainty: how sure is the applicability of rules, regulations, funds, contracts, etc.?

Q2.6 Institutional uncertainty				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	7	10.61	7	10.61
2	9	13.64	16	24.24
3	26	39.39	42	63.64
4	18	27.27	60	90.91
5	6	9.09	66	100.00

Q2.7
Could you explain or illustrate with examples, why you classified the uncertainties in column 4 and column 5 of question 2.3 to 2.6 as the most important?

Researchers (12):

- Uncertainties from institutional and from the society are the more important because of their impossible prediction. These kinds of uncertainties have unlogic and affective sources which make them unpredictable
-
- It is difficult to change the habits and to fight against different lobbying who profits of the present system

- - Social uncertainty is less important due to the bad knowledge of food production. - Technical and economic uncertainties are more important because farmer will develop these news technologies or ways of production if they can live with their work.- Institutional uncertainty will act by managing the evolution way of food production activity.
- New strategies has to be profitable. The farmer has te earn an income. Else he/she don't implement the innovation.The innovation has to reduce the risks or at least equal to the old one. Else the farmer stays to the old technique, he knows already
- Ad. 2.3: If the parlament/ministry does not provide research grants, new development is resticted.Ad. 2.4. When farmers for ex. does not trust a warning system telling them whne not to spray.Ad. 2.5. Seen for ex. with organic apple production in DK, where the production cost is higher than the price to obtain.Ad. 2.6 I do not really understand the question
- 2.4 Information technology in agriculture is evolving very fast but sensors, new PC based equipment on tractors, DSS etc. are not integrated. Precision Agriculture was interesting but has not succeeded yet - also due to many technical problems. Farmers do not have time to confront the computer each time a decision has to be taken!!2.5 Due to low numbers on the buttom line (income), farmers are reluctant to try out new strategies. They stick to safe and well-known control strategies. Target group for new technology is the extension service. They will then implement new strategies - but slowly. Only 4% of farmers use our (very comprehensive DSS on Internet) several times during the week. Approximately 75 % of the advisors use the systems regularly (more than 1 time during a week)
- the economic uncerttainty if pesticide applications are left undone (f.e. if using decision support systems) and the low costs of plant protection products are the most important reasons for using pesticides over the needed minimum
- 2.4: growers/advisors want to be very sure about the technical efficacy of new IPM strategies, when this is not clear thet will stick to the "old" strategy. 2.5: growers/advisors want to be very sure about the economic consequences of new IPM strategies, when this is not clear they will stick to the "old" strategy.
- succesfull implemantation will only occur if technique en profit are positive

Advisor for farm advisors (10):

- 2.4 If your advise or product is not working proper, that will lead to rejection in the future2.5 Farmers economy is very depending on responsible conduct
- lente évolution distribution court terme/long terme ==> difficultés à gérer l'évolution
- technical security is most important for users, environment and society- economic interests the base of all uses
- 2.3 Social uncertainty is not a case in Denmark2,4 Wee do have the technology which is available, and wee use avilable technology i Denmark 2,5 Depending on EU, and policy2.6 If a pesticide is leaching to groundwater, wee do realy have problems in the Nordic counties
- I do not fully understand this question
- The farmers behaviour is primarily economical.
- The technical certainty is crucial for the implementation of the decision support systems (DSS). Spraying with fungicides against late blight in potato need to be done on a preventive basis. The reliability of the DSS is of paramount importance because the economic consequences of a failure is enourmous.
- The first items can be influenced by farmers. The institutional uncertainty is a disaster; others are making your choices
- 2.3 Farmers and advisors must support a strategy. Often a innovation is not adopted because one does not dare to be the first to act different.2.4/2.5 A strategy has to be succesful and profitable, otherwise it will not be accepted.

- Using less pesticides is easy to wish but not so easy to do for economical reasons for the winegrowers due to technical uncertainty of the solution we propose to them : suppression of a treatment always represent a high risk on a short term point of view

Farm advisors (9):

- We now what we have but we don´t now what we get
- 2.4 We need to be sure that technology is without risks for environment ond that yield and quality is obtained.2.5 The farmers / products must not be forced to take additional costs without improvements in quality or yield.
- growers and advisers need to be very sure that a tecnique will work since the cost of failure is very high compared to a spray!
- New rules and regulations lead to increasing uncertainty in the use of current systems.Farmers will not use new product unless there is a good chance of an economic return.

Farmers (9):

- I live of my products
- No
- Pressures from government and consumer organisations are dominant over common sense.
- 2.5 depends on the kind of input:- new technique often is very expensive (for example side specific farming) and therefore only available for large farms- for example advisory systems basing on loss predictions need greatest accuracy
- Growing crops must be profitable, products are only applied to make money. there always has to be areturn from any product applied
- Technical &economic uncertainty: If it doesnt work correctly then early adopters are left with egg on their faces and a very large finacial penalty

Input suppliers (5):

- Innovations have to fulfil economical and ecological requirements(to be safe)Cost / benefit is important also in futureRegulations must be applicably and managable
- the most important driver to use a new product is its ability to do the job it's designed to do. Other factors listed should have been covered during the development process.
- Unless strategies are adopted by the whole market, becuase it is commercially oversupplied and subject to segmentation as a consequence, these will not be successful - as each stakeholder seeks to justify their own 'added value' approach.Becuase of the absolute need for farm profitablity, risk management is keyDitto for economic uncertaintylegislation is already too complex in this market, and paperwork MUSt be simple and easy to interpret/understand
- If products not accepted by end user protocols they cannot be recommended. Therefore must have their support.New products or strategies must be technically efficient and also meet all safety regulations. End users increasingly need justification of use.New crop protection strategies must show a clear benefit in yield and quality attributes over and above older technology, and certainly sufficient to provide an improved MOIC.
- There is no concensus across the country or indeed across Europe as to what sustainable agriculture actually is. This lack of concensus reflects in conflicting regulations, regulations that cannot deliver their objective, a lack of continuity between sequential research programmes and a lack of "joined up" thinking in research funding.

Interest groups (5):

- 2.4 Technique concerns resistance, needs a lot of attention2.5 Profit for the Farmer. new technoques should not be more expensive2.6 Government must be more reliable. Sometimes daconil is allowed in celeriac, sometimes forbidden
- Many farmers are very conservative and don't focus on pesticide use reduction, though they can spare money by doing it. It is very difficult to control the farmers use of pesticides, and to makke rules for the use, so you have to get them motivated for pesticide use reduction witkout being able to reward them economically.
- From a consumers point of view, plant protection is in a severe crisis of credibility. It is most important that this social uncertainty is overcome. One way is the inicial enhancement of credibility of institutions as standard setting organisations (something what is often done by trade recently...).From a farmers point of view probably the economic situation might be most important.
- For the industry a procedure to obtain an authorisation is difficult. At the moment a request is brought in, all needed facts are described. Usely the handling of the request passes 3 years later, and EU and Nederland don't handle the request at the same time. Usely the rules have changed in the meantime. "this is the problem of the moving goal-posts". Ar this moment the CTB has to handle a great lot of requests, which slows down all procedures.
- Crop management is the least profitable section of most industrial farms. Crop production just has to work for the farmer without much uncertainty. Therefore they rely a lot on the experience of others.

Government officers (3):

- a broad supprot among farmers and trade for IPM is important to feel sociologically in the main stream (innovative) and not being isolated or minority. For many famers IPM feels as a risk taking approach.
- Kosten zeitäufwändiger Diagnose- oder Bekämpfungsverfahren können mit Kosten von Standardmaßnahmen (z.B. PSM-Einsatz nach Beratungsempfehlung) nicht konkurrierenManagement-Aufwand zur Einführung neuer Strategien und Bekämpfungsverfahren steht für Betriebe nur selten in gutem Verhältnis zu den erzielbaren Mehrerträgen oder Verbesserungen im Produktionsverfahren
- In Germany there exist state-run support programs to support new technologies.Rules which are not checked can be broken. It is difficult to check rules in agriculture.

Trader/processors (3):

- New approaches need to work and the farmer should not loose money
- 2,3 this is not so important, the techn. unc. is low.2,6 the risk of the discussions of the officials is growing.
- Error: columns 4 and 5 (and not 2 &3) for the most important?!?Answers/examples already given in previous question: GMO example for the social uncertainty

Others (10):

- The government is like a Traffic light regarding legislation
- The social environment/security will change. Prices for energy and farm equipment will go up. About renewable energy there are still many uncertainties existing. There is still a big difference between the income of dairy versus "grain" farmers.
- 2.3 The chain often is very important. One cannot get a contract unless the demands of the chain are carried out.2.5 Investing in a new technogy is acceptable for a short period, for a longer period profit has to be expectable.

- In recent years, crop prices and increasing regulation have come to dominate many growers' thinking, making them more cautious and leaving them with less time to think innovatively.
- 2.4 and 2.5 Insurance policy, avoiding the risk of a greater loss if a disease or plague turns out to be more violent than expected.
- Best practices often are not used because of social pressure. The trader has a lot of influence and his interest is to trade.The pesticide registration policy is not reliable. Today something can be forbidden, next week it can be allowed again.
- techniques ad economics are related. If a result is workable it will be used automatically. The influence if an advisor is enormous
- Before someone decides to use something new the good result and profit have to be proven.

11 Questionnaire Section 3 – Targets and needs

Q3.1
In chapter 2 you specified the strongest forces and most important uncertainties in the innovation process towards sustainable crop protection. How do you uphold (i.e. protect or defend) your interests in this context at the short term? Which actions do you have in mind to protect your interests?

Researchers (12):

- We try to answer the questions by increasing our field of activity : environmental studies, economic actors or public acceptance ?. Etc We also try to communicate better on the positive sides of our results and studies
- manage new regulation restriction and to defend current practices to avoid hard evolution for farmers.- Be open to evolution but in good timing.- Avoid inapplicable rules which won?t improve the situation
- Make use of existing knowledge! But it is difficult for farmers to have all this information in mind. So we have to stimulate the use of simple decision support systems (applied advice systems at specific topics) where with simple questions the farmer can get acces to the broad knowledge.
- I try to focus on more basic research areas like more fundamental knowledge of the biology of plant pests and to include new technologies as tools in pest management.
- International collaboration combined with intensified contact with the producers and the extension service
- Building up a system of farms spread over Germany to explore the needed minimum dosage and to compare with the actual pesticide treatments done by the farmers
- Regarding late blight in potatoes we are carrying out trials/demonstrations to design/demonstrate strategies in which an efficient IPM control strategy is combined with a low input of fungicides and a good economic result.
- For the long term detailed Diagnosis systems and DSS are important to be improved. It is important too to focus on threshold values on the field level concerning minimum tillage as well as the effects of global climate change.
- Keep working on innovations
- I dont understand the question

Advisor for farm advisors (10):

- Advises are given first at an absolutely economicaly basis in a legaly way and second in the most sustainable way. Trying to lead the action against the most sustainable way if the loss is minimal
- Formation Conseil affiné ==> besoin d'outils
- Decision support tools are too complicated for using on a farmer basis
- I advise the farmers according to the list above. (the list 2.3-2.6in order to help them optimize their plant production and outcome as well
- It is important to gather the best possible data about pesticide efficacy against target weeds, pests and diseases in order to use as little as possible.
- The researchers should be more focused on the trends and practical problems on farm level. It is also important to focus on the sociological problems - i.e. disseminate research

results to farmer. I my position I will try to convince the researchers to change focus from environment to production. The two questions is complementary.
- Describe the economic consequences/benefits in using a reduced pesticide input and DSS
- keep working on training the advisors, to let them distinguish as companion in crop protection. This is in the interest of the farmers, that is why they will remain customer.
- Food safety; Counsel the farmers Inform the policy makerscost price: Inform Farmers about cost-effectivenessDLV provides objective information to all Dutch Farmers
- "Technical strategies are possible but they are expensive and funding is needed to study their effectiveness.To protect our interests on short term, we : -go on driving our job trying to lower chemical input at a low scale level -develop new techniques (precision farming)-develop support system tools for technicians-trying to enlarge contacts with other productions systems"

Farm advisors (9):
- Social - if there is no support from pulic / peers / government it wont work.Technical - if there is unsurity, it could hold up processEconomic - got to be cost effective
- No actions, but to keep a production of high quality.
- L?objectif est double: limiter les risques de contaminations de l?environnement et de l?utilisateur lors du traitement et à l?exploitation lors du stockage, remplissage et lavage de l?appareil. Aujourd?hui nous travaillons beaucoup sur la limitation des pollutions ponctuelles plus facile à éliminer dans un premier temps, ainsi que sur la protection des cours d?eau lors du traitement. Ensuite le travail se fera sur les techniques de pulvérisation plus performantes, ainsi que sur les techniques alternatives
- my interest is that of my grower to produce as much as we can for as little as possible! When a monitoring threshold tecnique is robust we will use it. If a non chemical tecnique is practical we will use it
- Improve "enviroental" areas of the farms to encourage biodiversity.To use agro chemicals to the optimum economic and environmental effect.

Farmers (9):
- I want to be responsible for the environment, but my potatoes must also be protected against deseases.
- Encourage more research and presentation of results by scientists that are aware of the more practicl and economic issues. Challenge minority groups that put foward unsupportable evidence to pursue their objectives.
- Use products responsibly Weed / pest pressure enforecs the decision making processIf farming is not profitable, buisnesses will fold
- Innovative technique should be available for farmers for example via internet, networks should be created.
- I want to know about new methods. But computers and warning systems does not yet work in potato protection
- ????

Input suppliers (5):
- Lobbying activities in industry associations, with politicians and regulatory authoritiesSupport a clearly defined and uniform European approach related to generic activities
- education of the public, legislators and end marketers
- By networking with relevent stakeholders in the market. By provision of information generated by funding indpendent research, as well as through our own internal R&D

capability and extensive knowledge.Our interests are to satisfy customer neesd and wants for mutual profitability, so we aim to provide solutions the UK farmer desires, and to his preferred specification on this basis.
- Better targetting of inputs through better knowledge of most effective application and timing techniques.
- Close liaison with science based influencers to provide uniformity of views

Interest groups (5):
- my task: Keep lobbying for a wide and cheap collection of chemicals.It is good the EU is harmonizing now. Each country must have the same collection, so unjustice will disappear and knowledge can be shared
- By demanding that the farmers logbooks on pesticide use are open for everyone on a website. By demanding the farmers to monitor the pests before deciding to spray. By demanding the farmers to use the new tecnology which can minimise the pesticide use.
- Because our interest is objective exchange of knowledge and development of science based new approaches, our main method is helding workshops and symposia, participation in meetings and communication. The protection of our interest is done by strenghtening the own position by co-operative operation of such events with other interest groups (what is not very easy!).
- Nefyto has developed a product Steward key, it contains the the rules the industry is given itself. The complete procedure can be found on: http://www.nefyto.nl/sitedata/www.nefyto.nl/uploads/misc/Gedragscode/Gedragscode.pdf
- Our main tactics is to convince the minister of the environment that the farming industry is not living up to its promises on pesticide reduction.

Government officers (3):
- If the opportunities and risks in IPM are clear and methods quite robust this helps a lot. Avoiding risk with decision support systens and clear action thresholds are important for most famers. So offer security..
- politische Kommunikation: Einhaltung aller rechtlichen Rahmenbedingungen ist absolut notwendig, insbesondere zur Vermeidung von Überschreitungen bei Rückstandshöchstmengen und Vermeidung von UmweltkontaminationenEbenso ist es erforderlich, den Landwirten und Gärtnern chemische Bekämpfungsmöglichkeiten insbesondere in Kleinkulturen zu eröffnen
- My tactic track is to complete an existing list of sprayers and their equipment in which their ability is described to reduce the drift. That is done in steps of 90%, 75% and 50% drift reducing. A second tactic track is to design a new list of sprayers and their equipment in which the amount of applied pesticides can be reduced without any effect on the activity (e.g. local treatment).

Trader/processors (3):
- Member of IBMA, more influence in polity
- "Tactic intentions: prevent any food safety issue, promote/ implement Good Agricultural Practices, be able to communicate about them.Actions: -Internal policy vs GMO and communication about it if needed -Develop knowledge about pesticide legislation evolution and anticipation when possible -Development of Decision Support Systems to minimise crop input usage, costs and preserve quality -Strong communication to growers about GAP?s; Pesticide positive list, control of applications, strong communication and policy if BAP detected -Request, promote farms/crops certification (food safety schemes, ?GAPs

schemes?) -Maintain a pesticide and other contaminants residue database as a part of the Haccp procedure"

Others (10):

- In the field Vewin has no power, the District Water Boards does, so they cooperate with them. Vewin promotes proven innovations. Projects like "Produce with perspective (telen met toekomst)", "Clean Spring (Schone bronnen (source))" are supported by Vewin
- world food supply at a quality demanded
- I am not used to think in this way. As a teacher I have no decisive role. I can act like an educator. Regarding EPC; it is advisable students get entrance to EPC since they are the future users.
- Provide funding for work to reduce pesticide residues. Provide funding for monitoring of residues (mycotoxins, pesticides etc). Work with others to try and increase public understanding of farming.
- Our most important interest is to give trustworthy advice to our customers. New techniques have to be proven well before they can be promoted. Besides that there are several kinds of customers; tradional thinking, ewraly adoptors and so on.
- For my own organisation it is important to keep ahead of traders and industry.We play a role in implementing innovations en participate in new projects.
- regarding economical uncertainties. a lot of attention is needed for sustainable crop protection. Don't us chemicals in green manure
- As a researcher no interests are involved.watch with critical view whether a new method is an improvement.

Q3.2
What type of knowledge or expertise (from European Crop Protection Competence Centre (EPC) or others) would you find most useful to support the short term improvement of your current practices?

Q3.2 Tactical knowledge/expertise				
Type of knowledge or expertise	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
early warning and decision support tools	42	13.68	42	13.68
pesticide efficacy	36	11.73	78	25.41
environmental impact of pesticides	32	10.42	110	35.83
costs and benefits of pesticides	27	8.79	137	44.63
pest monitoring and detection tools	26	8.47	163	53.09
pesticides registered	25	8.14	188	61.24
non-chemical alternative measures	21	6.84	209	68.08
pesticide application technology	19	6.19	228	74.27

Q3.2 Tactical knowledge/expertise				
Type of knowledge or expertise	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
pesticide residue levels	10	3.26	238	77.52
pesticide (biological) side effects	9	2.93	247	80.46
extrapolation of applications to minor crops	8	2.61	255	83.06
pest/disease free planting material	8	2.61	263	85.67
biological pest/disease control measures	7	2.28	270	87.95
descriptions of quality assurance schemes	6	1.95	276	89.90
others	6	1.95	282	91.86
sampling plans for target organisms	6	1.95	288	93.81
product stewardship in other countries	5	1.63	293	95.44
green manures, trap crops etc.	4	1.30	297	96.74
mechanical weed control techniques	4	1.30	301	98.05
protective clothing, safe working methods	3	0.98	304	99.02
tracing and tracking of pesticide sales	3	0.98	307	100.00

If the priorities of Q3.2 are grouped in five main groups, then the summarization looks as follows:

Q3.2 Tactical knowledge/expertise - grouped				
Group	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
Pesticide utilization	133	43.32	133	43.32
Pest monitoring	74	24.10	207	67.43
Alternative measures	44	14.33	251	81.76
Environment	41	13.36	292	95.11
Others	15	4.89	307	100.00

The priorities of Q3.2 are grouped by country below:

Q3.2 Tactical knowledge/expertise	Country				
	Denmark	United Kingdom	The Netherlands	Germany	France
early warning and decision support tools	14.81	9.46	14.52	13.04	18.18
pesticide efficacy	11.11	18.92	11.29	4.35	9.09
environmental impact of pesticides	6.17	13.51	6.45	13.04	15.91
costs and benefits of pesticides	11.11	10.81	4.84	10.87	4.55
pest monitoring and detection tools	8.64	9.46	6.45	4.35	13.64
pesticides registered	2.47	10.81	9.68	13.04	6.82
non-chemical alternative measures	8.64	4.05	6.45	4.35	11.36
pesticide application technology	8.64	1.35	8.06	6.52	6.82
pesticide residue levels	1.23	6.76	1.61	2.17	4.55
pesticide (biological) side effects	2.47	2.70	4.84	4.35	0.00
extrapolation of applications to minor crops	0.00	0.00	8.06	6.52	0.00
pest/disease free planting material	4.94	0.00	4.84	2.17	0.00
biological pest/disease control measures	4.94	0.00	3.23	2.17	0.00
descriptions of quality assurance schemes	1.23	1.35	0.00	6.52	2.27
others	2.47	1.35	3.23	2.17	0.00
sampling plans for target organisms	0.00	4.05	3.23	0.00	2.27

product stewardship in other countries	2.47	2.70	0.00	2.17	0.00
green manures, trap crops etc.	3.70	0.00	0.00	0.00	2.27
mechanical weed control techniques	3.70	0.00	1.61	0.00	0.00
protective clothing, safe working methods	0.00	1.35	1.61	0.00	2.27
tracing and tracking of pesticide sales	1.23	1.35	0.00	2.17	0.00

Q3.2 Tactical knowledge/expertise - grouped	**Country**				
	Denmark	**United Kingdom**	**The Netherlands**	**Germany**	**France**
Pesticide utilization	38.27	52.70	43.55	47.83	31.82
Pest monitoring	23.46	22.97	24.19	17.39	34.09
Alternative measures	25.93	4.05	16.13	8.70	13.64
Environment	8.64	16.22	11.29	17.39	15.91
Others	3.70	4.05	4.84	8.70	4.55

Q3.2
Other useful types of knowledge/expertise for improvement of tactic track/current practices

- free access centre for practical disease weed research across europe eg results from French phoma resistance trials
- Give residu-research a place in EPC
- Herbicides cause most problems with water
- providing information about international scientific meetings
- the experts amd advisers should filter all avialable possibilities and present a good package to me
- what fungicides are best?

Q3.3
In chapter 2 you specified the strongest forces and most important uncertainties in the innovation process towards sustainable crop protection. In chapter 1 you described your

dream for crop protection in your country in 2015. What is your strategic vision (paradigma) to bridge the gap between "doom" and "dream"? Which innovation processes do you have in mind to bring your dream within reach?

Researchers (12):

- Promote interdisciplinary works , and avoid traditional oppositions or competition between agronomists and geneticians for exemple . They have to work together under commun projets to find optimized ways associating cultural management and genetic resources
- More funds allocated to research
- Better and cheaper characterization of plant characteristic (pest tolerance, dry tolerance physiology ?) by biotechnology.- Improvement of micro organism assessment
- genetic improvement of varieties stimulated by GMO
- Continously development of pest management strategies to organic farming. Including of new techniques like biosensors, DNA-tools and others in IPM.
- More EU harmonisation on all levels regarding pesticide use. More integration and better utilization of existing knowledge. You can say that we need a break for "consolidation". Who will pay for that? Integration of DSS, traceability and quality control systems.
- taxes and pesticides and using the money taken in for a fund compensaiting farmers practising integrated plant protection in the case of yeald losses
- First all DSSs will have to be technically sound. Applying sprays according to DSS will on average imply more costs. It is impossible to spray large fields with one sprayer under optimal circumstances. The increased costs will have to be paid for.
- Plant protection measures should intensively use methods of precision farming and IPM. The possibilities and options of use of GMO-crops should be applied and further explored. The possible changes of the consequenses resulting from the increasing growth of biomass production for renewable energysources and their consequenses for plant protection in general should be concerned for the future.
- develope functional biodiversity. Availability of a wide range of selective chemicals without polluting effects. Develope biological methodes
- Disease / pest resistant crops and varietiesBiological natural controlNovel methods to overcome resistanc eot pesticides

Advisor for farm advisors (10):

- We need to have alternative products to replace the most uncertain productsWe need more trials and research to find out the moust sustainable farming methods - via better products and decision support systems
- Stronger focus on preventive crop rotations and breeding of resistant varieties
- Closer contact between farmer, advisers, research people and companies In the Nordic countries wee are thinking more, that wee need to help the farmer, in other countries they are thinking more in profit.
- We need to focus more on development of information and communication technology that allows us to keep reducing pesticide use while keeping high output. We need to learn from organic agriculture how to make better use of crop rotations etc. in order to prevent problems rather than solving them.
- I hope funding will be directed toward development and implementation of high technology methods as vision systems for recognize weeds, sensors for early warning in relation to diseases, cell spraying technology for spraying weeds etc. GMO will be important to get more disease resistent corps.
- Bring the research a advisory system together in a common effort to develop, implement and evaluate new tools for pest control

- same as 3.1. Farmers will have to lear to ask for help earlier, now sometimes a bad solution is needed, because the disease/... was not fought in an early stage
- Same as 3.1. tuning of Policy makers has to be done international- promote variety-improvement and precision-agriculture- Best practices differ even in regions inside Nederland
- "Strategic target = better understanding and knowledge of epidemiological behaviour on pests and funguses Tolls = - precision farming- precision meteo- populations genetics- statistical studies on development of the diseases"

Farm advisors (9):

- Strong environmental focus to gain support for the insutry within the general public (consumers)
- learn more about the weather, related to phytophthora infestans
- I am afraid it is out of my hands. I will try to keep updated and support the research and development of these topics.
- La stratégie est d?améliorer d?abord les pratiques : éliminer les pollutions ponctuelles de l?environnement par des aménagements adaptés, diminuer les dérives et les doses utilisées lors de la pulvérisation par l?utilisation de matériels plus performants, aménager correctement le parcellaire (haie, bandes enherbées) en fonction des risques de transfert, augmenter et améliorer l?utilisation de matériels de lutte non chimique contre les adventices en vigne (outil de travail du sol). Diminuer la vente des produits qui présentent un risque important (pour la santé, l?environnement ou le consommateur).
- I don't have a doom scenario. Food will continue to be needed and therefore grown. We need to maximise production on the minimum of land, manage non farmed land for biodiversity, and continue developing innovative ways of controlling pests/weeds. We need to rotate our methods as well as our crops.
- Non chemical control of peats. Failing that use of season long seed dressings.

Farmers (9):

- I hope that the goverment will understand my situation and give me the possibility to farm.
- GM technology to resolve allpest and disease issues.
- Manufacturers need to continue to invest in scienceWe need products with proven reliability and safety
- Decision support systems should be available for everyone.
- Improvements in plant breeding to see more natural resistance to pests and disease.
- i must change all the time to new situations - i do that a lot
- As far as weed control is concerned ; I think that some effort should be made to harness the talent of those working in unversities on industrial machine vision - a sort of DARPA style competition/challenge -initally focussed on improving weed/plant recognition algorithms (this could be entirely web based and therefore international) the challenge could, in following years, evolve into a competition carried out in the field.

Input suppliers (5):

- One European regulatory authority which provides registrations in a fast and efficient process to offer true innovations in terms of safety and efficiency to the market in due timeOptimize/ finalize Annex 1 listing process for old compounds and implement reliable and fast process for new actives
- a supply of high quality information from reputable sources that stands up to peer review. And high quality deliverers of that information. In a technological age, there is still a lot to be said for a human rather than machine approach to some issues.

- More emphasis on inherent genetic characteristics in plants to be used to reduce reliance on pesticides - eg disease resistance.Possible wider acceptance of GM technology
- The dream would be a Uk poulation at ease with UK crop production methods. To reach that dream we need to. 1. Explain the benefits of modern crop production in producing a plentiful supply of quality food. 2. Improve and explain technologies to allow minimal environmental impact of agriculture. 3. Emphasise the importance of agriculture to modern life and re-establish the link in the public mind between food, energy and farming.

Interest groups (5):

- we are moving in the correct direction
- EU and the memberstates set ambitious targets for pesticides use reduction and development of new technology that could fullfill the goals.The farmers are getting forced to use the new tecnology, and the development of new tecnology is supported by EU and governments.
- Education, education, education
- Nefyto already has his own channels. EPC probably does not add new aspects.Quick allowance of new innovative chemicals in desirable
- 1. To ride on the general enthusiasm surrounding organic farming in this country.2. To persuade amajority of members of parliament that the farming community is not living up to its promises.3. Help create tools to reduce pesticide use.

Government officers (3):

- To reach a broad supprot for IPM among all stakeholders (production chain, policy makers and consumers).Agriculture shoudl move gradually but steadily from conventional to IPM and to low imput (including organic)
- Klare rechtliche Rahmenbedingungen: in Novelle 91/414 sowie Rahmenrichtlinie zur Anwendung von Pflanzenschutzmitteln bereits auf EU-Ebene verankern, anschließend stringent in D umsetzenInnovationsförderung für technische/elektronische/high-tec-Entwicklungen im PS verstärkenstärkere Eigenkontrollmechanismen in der Handelskette (QS) durchsetzen
- My strategic track is to prepare the extended use of electronic support by analysis of the process of application.

Trader/processors (3):

- Closer cooperation with the scientists with official grand, to bring the results into the practiceCost reduce for registration of biol. products
- "Develop more sustainable ways of crop protection, improve current practices, improve communication to basic consumers (reconcile them with ?needed pesticides?)- Strong investment of Agrochemical companies (and advisory groups/entities) to develop economical alternative ways of crop protection (soil/plant pest-disease antagonisms, biological control, better combination of mechanical/chemical control) and ?soft? products- Better grower education (in term of pesticide usage, risk exposure, tox & ecotoxicity?) (insufficient training in agricultural schools and on-going training) and ?philosophy approach? (Most growers still see legislation about pesticides as constraints!). Improve paradoxal situations (ex: needed protective clothing and equipment of a grower and image of it!)- (Utopia!) Set an independent, objective credible system/entity of communication about pesticides usage, advantages and drawbacks. Agrochemical companies, growers, food companies, governments aren?t credible anymore! (even scientists!)"

Others (10):

- One has to regard the complete system. Integrated crop management is the best method. Rather use one bad (to the environment) chemical once if it does the job, than ten times a chemical which is not as bad for the enevironment, but less effective to the job.
- reducing wasteeffectiveness of productsSchool visits
- Confront students with their behaviour en the long term effects of their behaviour.Show good examples from research and practice.
- Increased funding for research into crop protection strategies and more effective means of ensuring uptake of new technologies by growers
- Early warning and monitoring systems need improvement. Farmers don't have time to do a lot of observations, this is why tose sytems fai. So someone has to do the observations for them (sometimes a satellite is possible). Secondly farmers don't have time to consult an internet-advice-system which needs a lot of input. Better is a Fax or SMS system.
- Coalitions are needed to reach goals. A small group can reach nice solutions, when the group becomes bigger this is getting more difficult. Interests then will be to big. One has to be creative to solve the problem. A example of a good innovation is paying farmers for not growing crops on the borders.
- In the ideal situation the consumer has to pay more for his food to finance the innovations
- Info onn all items in the lists 3.2 and 3.4 already exist on the internet. EPC does not have to add any information. A portal to all existing info is sufficient

Q3.4
What type of knowledge or expertise (from European Crop Protection Competence Centre (EPC) or others) do you find most useful to support the development of your longer term / future practices?

Q3.4 Strategic knowledge/expertise				
Type of knowledge or expertise	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
resistant varieties/cultivars	33	10.03	33	10.03
early warning and decision support tools	29	8.81	62	18.84
pesticide efficacy	27	8.21	89	27.05
environmental impact of pesticides	24	7.29	113	34.35
non-chemical alternative measures	21	6.38	134	40.73
precision agriculture	21	6.38	155	47.11
genetically modified crops	19	5.78	174	52.89
costs and benefits of pesticides	16	4.86	190	57.75
innovation networks of farmers	16	4.86	206	62.61
pesticide application technology	16	4.86	222	67.48

Q3.4 Strategic knowledge/expertise				
Type of knowledge or expertise	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
preventive crop rotations and husbandry practices	16	4.86	238	72.34
pest monitoring and detection tools	15	4.56	253	76.90
pesticide residue levels	13	3.95	266	80.85
biological pest/disease control measures	9	2.74	275	83.59
review on effects of functional agro-biodiversity	8	2.43	283	86.02
examples of national pesticide action plans	5	1.52	288	87.54
social learning of stakeholders	5	1.52	293	89.06
supply chain co-ordination	5	1.52	298	90.58
innovative entrepreneurship	4	1.22	302	91.79
others	4	1.22	306	93.01
review on effects of organic agriculture	4	1.22	310	94.22
import/export flows of agricultural commodities	3	0.91	313	95.14
pest/disease free planting materials	3	0.91	316	96.05
pesticide (biological) side effects	3	0.91	319	96.96
public private partnerships	3	0.91	322	97.87
elimination of infection sources	2	0.61	324	98.48
green manures, trap crops, etc.	2	0.61	326	99.09
mechanical weed control techniques	2	0.61	328	99.70
sampling plans for target organisms	1	0.30	329	100.00

Q3.4
Other useful types of knowledge/expertise for improvement of strategic track/future practices

- be rerserved on use of GMO
- persistence
- to be honest i mostly change when i have to

- Use of satellites
- use studygroeps, farmers stimulate each other

12 Questionnaire Section 4 – Current and future information management

Q4.1
Which of the following sources of information are most valuable to you today?

Q4.1 Most valuable information sources				
Source of information	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
pers. comm. advisers own country	46	18.25	46	18.25
scientific publ. English	35	13.89	81	32.14
internet English	32	12.70	113	44.84
magazines native lang.	26	10.32	139	55.16
national seminars	19	7.54	158	62.70
internet native lang.	17	6.75	175	69.44
magazines English	17	6.75	192	76.19
pers. comm. colleagues abroad	16	6.35	208	82.54
scientific publ. native lang.	15	5.95	223	88.49
international seminars	12	4.76	235	93.25
local training courses	6	2.38	241	95.63
internet other lang.	4	1.59	245	97.22
magazines other lang.	4	1.59	249	98.81
scientific other	2	0.79	251	99.60
others	1	0.40	252	100.00

The table below presents Q4.1 grouped by country:

Q4.1 Most valuable information sources	Country				
	Denmark	**United Kingdom**	**The Netherlands**	**France**	**Germany**
pers. comm. advisers own country	23.33	21.67	16.36	13.16	12.82
scientific publ. English	13.33	21.67	12.73	5.26	12.82
internet English	5.00	20.00	20.00	7.89	7.69

magazines native lang.	8.33	0.00	12.73	15.79	20.51
national seminars	11.67	5.00	7.27	5.26	7.69
internet native lang.	8.33	0.00	5.45	15.79	7.69
magazines English	1.67	21.67	3.64	2.63	0.00
pers. comm. colleagues abroad	8.33	3.33	7.27	7.89	5.13
scientific publ. native lang.	10.00	0.00	3.64	2.63	15.38
international seminars	6.67	0.00	1.82	10.53	7.69
local training courses	0.00	3.33	1.82	5.26	2.56
internet other lang.	0.00	1.67	3.64	2.63	0.00
magazines other lang.	0.00	1.67	3.64	2.63	0.00
scientific other	1.67	0.00	0.00	2.63	0.00
others	1.67	0.00	0.00	0.00	0.00
Total	60	60	55	38	39

Q4.1
Other top sources of valuable information on crop protection

- Committees, workshops
- taks with colleages in erfa-group

Q4.2
Below you find a list of potential barriers for getting access to useful/appropriate information on crop protection, especially information originating outside your country. In your opinion, how important are the following potential barriers

Q4.2 missing summary in my language				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	20	30.30	20	30.30
2	14	21.21	34	51.52
3	11	16.67	45	68.18

Q4.2 missing summary in my language				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
4	9	13.64	54	81.82
5	12	18.18	66	100.00

Q4.2 missing main text in my language				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	24	36.36	24	36.36
2	14	21.21	38	57.58
3	12	18.18	50	75.76
4	8	12.12	58	87.88
5	8	12.12	66	100.00

Q4.2 missing summary in English				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	11	16.67	11	16.67
2	6	9.09	17	25.76
3	16	24.24	33	50.00
4	6	9.09	39	59.09
5	27	40.91	66	100.00

Q4.2 missing main text in English				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	15	22.73	15	22.73
2	6	9.09	21	31.82

Q4.2 missing main text in English				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
3	16	24.24	37	56.06
4	5	7.58	42	63.64
5	24	36.36	66	100.00

Q4.2 I do not know of relevant sources				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	17	25.76	17	25.76
2	12	18.18	29	43.94
3	13	19.70	42	63.64
4	14	21.21	56	84.85
5	10	15.15	66	100.00

Q4.2 I do not subscribe to sources				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	16	24.24	16	24.24
2	13	19.70	29	43.94
3	21	31.82	50	75.76
4	7	10.61	57	86.36
5	9	13.64	66	100.00

Q4.2 I do not know relevant scientists				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	19	28.79	19	28.79

Q4.2 I do not know relevant scientists				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
2	14	21.21	33	50.00
3	18	27.27	51	77.27
4	9	13.64	60	90.91
5	6	9.09	66	100.00

Q4.2 I do not know relevant institutions				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	20	30.30	20	30.30
2	15	22.73	35	53.03
3	19	28.79	54	81.82
4	5	7.58	59	89.39
5	7	10.61	66	100.00

Q4.2 results do not address my context				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	11	16.67	11	16.67
2	10	15.15	21	31.82
3	27	40.91	48	72.73
4	14	21.21	62	93.94
5	4	6.06	66	100.00

Q4.2 results regard irrelevant methods				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**

Q4.2 results regard irrelevant methods				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	10	15.15	10	15.15
2	14	21.21	24	36.36
3	19	28.79	43	65.15
4	13	19.70	56	84.85
5	10	15.15	66	100.00

Q4.2 results do not work in my climate				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	11	16.67	11	16.67
2	14	21.21	25	37.88
3	21	31.82	46	69.70
4	10	15.15	56	84.85
5	10	15.15	66	100.00

Q4.2 cropping system different				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	11	16.67	11	16.67
2	14	21.21	25	37.88
3	19	28.79	44	66.67
4	12	18.18	56	84.85
5	10	15.15	66	100.00

Q4.2 I have no time for internet search

Importance	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	22	33.33	22	33.33
2	9	13.64	31	46.97
3	19	28.79	50	75.76
4	8	12.12	58	87.88
5	8	12.12	66	100.00

Q4.2 I have no time to search databases				
Importance	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	17	25.76	17	25.76
2	9	13.64	26	39.39
3	21	31.82	47	71.21
4	8	12.12	55	83.33
5	11	16.67	66	100.00

Q4.2 my reading skills are limited				
Importance	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	32	48.48	32	48.48
2	13	19.70	45	68.18
3	16	24.24	61	92.42
4	3	4.55	64	96.97
5	2	3.03	66	100.00

Most important information barriers	Mean importance
Q4.2 missing summary in English	3.48
Q4.2 missing main text in English	3.26

Q4.2 results regard irrelevant methods	2.98
Q4.2 cropping system different	2.94
Q4.2 results do not work in my climate	2.91
Q4.2 results do not address my context	2.85
Q4.2 I do not know of relevant sources	2.82
Q4.2 I have no time to search databases	2.80
Q4.2 I do not subscribe to sources	2.70
Q4.2 missing summary in my language	2.68
Q4.2 I have no time for internet search	2.56
Q4.2 I do not know relevant scientists	2.53
Q4.2 I do not know relevant institutions	2.45
Q4.2 missing main text in my language	2.42
Q4.2 my reading skills are limited	1.94

Q4.2
Other important barriers for getting access to useful/appropriate information

- A central web based index of new publications / information
- Crop Protection is not my main skill
- i do not have time to search informaton myself - i am farmer
- information must adress my situation on my farm
- inputs from science are either too complicated to be used in practice or address a too small part of the whole problem
- not filled out
- reviews are rare and underestimated by specialists
- transdisciplinary approaches are rarely published
- we need better networks to exchange information

Q4.3
The forthcoming European Pest Control Competence Centre (EPC) will be initiated as a website. Its focus will be to present in a structured way information that is ready to use in crop protection. Could you indicate how important you rate the following features?

Q4.3 generally easy to use				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
3	2	3.03	2	3.03
4	12	18.18	14	21.21
5	52	78.79	66	100.00

Q4.3 clear, structured interface

Importance	Frequency	Percent	Cumulative Frequency	Cumulative Percent
3	1	1.52	1	1.52
4	15	22.73	16	24.24
5	50	75.76	66	100.00

Q4.3 intuitive navigation				
Importance	Frequency	Percent	Cumulative Frequency	Cumulative Percent
2	4	6.06	4	6.06
3	14	21.21	18	27.27
4	15	22.73	33	50.00
5	33	50.00	66	100.00

Q4.3 good, efficient search method				
Importance	Frequency	Percent	Cumulative Frequency	Cumulative Percent
2	1	1.52	1	1.52
3	5	7.58	6	9.09
4	14	21.21	20	30.30
5	46	69.70	66	100.00

Q4.3 navigation in English				
Importance	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	4	6.06	4	6.06
3	15	22.73	19	28.79
4	8	12.12	27	40.91
5	39	59.09	66	100.00

Q4.3 navigation in my own language				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	12	18.18	12	18.18
2	7	10.61	19	28.79
3	20	30.30	39	59.09
4	6	9.09	45	68.18
5	21	31.82	66	100.00

Q4.3 summaries in English				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	2	3.03	2	3.03
2	2	3.03	4	6.06
3	12	18.18	16	24.24
4	8	12.12	24	36.36
5	42	63.64	66	100.00

Q4.3 summaries in my own language				
Importance	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
1	11	16.67	11	16.67
2	6	9.09	17	25.76
3	16	24.24	33	50.00
4	7	10.61	40	60.61
5	26	39.39	66	100.00

Q4.3 content in English

Importance	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	2	3.03	2	3.03
2	1	1.52	3	4.55
3	11	16.67	14	21.21
4	15	22.73	29	43.94
5	37	56.06	66	100.00

Q4.3 content in my own language				
Importance	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	9	13.64	9	13.64
2	12	18.18	21	31.82
3	19	28.79	40	60.61
4	4	6.06	44	66.67
5	22	33.33	66	100.00

Most important features of the EPC	Mean importance
Q4.3 generally easy to use	4.76
Q4.3 clear, structured interface	4.74
Q4.3 good, efficient search method	4.59
Q4.3 summaries in English	4.30
Q4.3 content in English	4.27
Q4.3 navigation in English	4.18
Q4.3 intuitive navigation	4.17
Q4.3 summaries in my own language	3.47
Q4.3 content in my own language	3.27
Q4.3 navigation in my own language	3.26

Q4.3
Other specific needs for the EPC

- Clear definitions: are "pests" related to "pesticides"? What about disease, weeds and so called pesticides?

- Free access
- Geografic info (regarding water-flow
- i do not want to read long rapports - short messages please
- In case all main-text is in Engels a summary in the own laguage is preffered
- Index of sources used and the opportunity to suggest new sources
- information must be free - i do not want to pay for more
- it should be opdated information
- links to other relevant material
- list of contacts
- Maximum use of three or four mouse clicks to find wanted information - a challenge to the designers of the expert system
- no passwords
- not too teoretical - i want information i can use
- quick access to relevant page (few 'clicks')
- Relevant info on Water-collection areas
- relevant information
- Short description of the source of the information
- the website is updated - also after your project has expired
- transparent with respect to original sources of data
- Updated information
- well chosen pictures
- well explained fig & graphs

13 Questionnaire Section 5 – Practical start of EPC

Q5.1
What, in your professional opinion, are the most important crop protection topics to be covered by EPC with regard to potatoes?

Q5.1 Most important topics regarding potatoes				
Crop protection topic	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
mgmt. of diseases in general	23	8.36	23	8.36
mgmt. of late blight	23	8.36	46	16.73
potatoes not relevant for me	19	6.91	65	23.64
pesticide application technology	18	6.55	83	30.18
non-chemical alternative measures	17	6.18	100	36.36
pesticide resistance prevention	17	6.18	117	42.55
DSS late blight	16	5.82	133	48.36
mgmt. of pests in general	16	5.82	149	54.18
monitoring late blight	16	5.82	165	60.00
resistance late blight	16	5.82	181	65.82
mgmt. of weeds in general	15	5.45	196	71.27
env. impact of relevant pesticides	14	5.09	210	76.36
thresholds for pest/disease control	14	5.09	224	81.45
mgmt. in organic production	12	4.36	236	85.82
pesticide residue levels	12	4.36	248	90.18
infection sources late blight	6	2.18	254	92.36
post harvest diseases	6	2.18	260	94.55
mgmt. of early blight	5	1.82	265	96.36
mgmt. of aphids	4	1.45	269	97.82

Q5.1 Most important topics regarding potatoes				
Crop protection topic	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
others	4	1.45	273	99.27
mgmt. of nematodes	2	0.73	275	100.00

Below, the priorities regarding Q5.1 are grouped after country. The numbers in cells are column frequencies:

Q5.1 Most important topics potatoes	Country				
	Denmark	**The Netherlands**	**United Kingdom**	**Germany**	**France**
mgmt. of diseases in general	7.37	11.11	5.56	11.11	7.41
mgmt. of late blight	11.58	7.94	5.56	8.33	3.70
potatoes not relevant for me	0.00	1.59	14.81	11.11	22.22
pesticide application technology	8.42	9.52	3.70	2.78	3.70
non-chemical alternative measures	7.37	4.76	1.85	5.56	14.81
pesticide resistance prevention	3.16	9.52	9.26	2.78	7.41
DSS late blight	9.47	6.35	1.85	2.78	3.70
mgmt. of pests in general	7.37	4.76	5.56	8.33	0.00
monitoring late blight	6.32	7.94	7.41	0.00	3.70
resistance late blight	8.42	4.76	1.85	8.33	3.70
mgmt. of weeds in general	3.16	7.94	5.56	8.33	3.70
env. impact of relevant pesticides	2.11	3.17	7.41	8.33	11.11

thresholds for pest/disease control	4.21	6.35	5.56	5.56	3.70
mgmt. in organic production	5.26	4.76	1.85	8.33	0.00
pesticide residue levels	3.16	3.17	9.26	2.78	3.70
infection sources late blight	2.11	1.59	3.70	0.00	3.70
post harvest diseases	5.26	0.00	1.85	0.00	0.00
mgmt. of early blight	2.11	1.59	1.85	2.78	0.00
mgmt. of aphids	1.05	0.00	1.85	2.78	3.70
others	2.11	3.17	0.00	0.00	0.00
mgmt. of nematodes	0.00	0.00	3.70	0.00	0.00

Q5.1
Other important crop protection topics to be covered by EPC with regard to potatoes

- Alternaria, because it's not researched well enough
- best practise for management of soil born viruses
- How crops get infected; biological versus traditional
- i haved marked DSS but i doubt they will ever work
- persistence, emissions-routes

Q5.2
What, in your professional opinion, are the most important crop protection topics to be covered by EPC with regard to wheat?

Q5.2 Most important topics regarding wheat				
Crop protection topic	Frequency	Percent	Cumulative Frequency	Cumulative Percent
pesticide resistance prevention	33	11.30	33	11.30
forecasting tools pests/diseases	28	9.59	61	20.89
mgmt. diseases in general	28	9.59	89	30.48
crop rotations to prevent problems	21	7.19	110	37.67
DSS pesticides and dosages	19	6.51	129	44.18
env. impact of relevant pesticides	19	6.51	148	50.68
mgmt. weeds in general	17	5.82	165	56.51
pesticide application technology	17	5.82	182	62.33
thresholds for pest/disease control	15	5.14	197	67.47
wheat not relevant for me	13	4.45	210	71.92
mgmt. of Septoria	12	4.11	222	76.03
pesticide residue levels	12	4.11	234	80.14
mgmt. pests in general	11	3.77	245	83.90
mgmt. of annual grass weeds	9	3.08	254	86.99
others	9	3.08	263	90.07
mapping tools for weeds	8	2.74	271	92.81
mgmt. in org. prod	8	2.74	279	95.55
mgmt. of perennial weeds	6	2.05	285	97.60
non-chemical alternaive measures	5	1.71	290	99.32
mgmt. of specific pests	2	0.68	292	100.00

Below, the priorities regarding Q5.2 are grouped after country. The numbers in cells are column frequencies:

Q5.2 Most important topics wheat	Country				
	United Kingdom	Denmark	The Netherlands	Germany	France
pesticide resistance prevention	12.50	4.69	11.67	17.39	11.54
forecasting tools pests/diseases	7.29	7.81	13.33	15.22	3.85
mgmt. diseases in general	8.33	7.81	15.00	8.70	7.69
crop rotations to prevent problems	9.38	7.81	5.00	4.35	7.69
DSS pesticides and dosages	6.25	6.25	8.33	8.70	0.00
env. impact of relevant pesticides	8.33	3.13	5.00	6.52	11.54
mgmt. weeds in general	6.25	9.38	3.33	4.35	3.85
pesticide application technology	6.25	4.69	8.33	4.35	3.85
thresholds for pest/disease control	4.17	7.81	3.33	6.52	3.85
wheat not relevant for me	0.00	7.81	1.67	2.17	23.08
mgmt. of Septoria	4.17	3.13	5.00	4.35	3.85
pesticide residue levels	8.33	1.56	3.33	0.00	3.85
mgmt. pests in general	6.25	1.56	5.00	0.00	3.85
mgmt. of annual grass weeds	4.17	3.13	0.00	6.52	0.00
others	1.04	6.25	5.00	2.17	0.00
mapping tools for weeds	3.13	3.13	1.67	4.35	0.00

mgmt. in org. prod	1.04	6.25	1.67	2.17	3.85
mgmt. of perennial weeds	1.04	6.25	1.67	0.00	0.00
non-chemical alternaive measures	1.04	1.56	1.67	2.17	3.85
mgmt. of specific pests	1.04	0.00	0.00	0.00	3.85

Q5.2
Other important crop protection topics to be covered by EPC with regard to wheat

- actual info about incedence of diseases in Europe during the cropping season
- best practices for management of Fusarium
- best practise of virus diseases in general
- Blackgrass control
- Fusarium
- how to best make profit from wheat on sandy soil
- how to control potatos in wheat and barly
- Seed treatment
- we need to focus much more on healthy crop rotations in the future

Q5.3
What, in your professional opinion, are the most important crop protection topics to be covered by EPC with regard to apples?

Q5.3 Most important topics regarding apples				
Crop protection topic	Frequency	Percent	Cumulative Frequency	Cumulative Percent
apples not relevant for me	39	22.54	39	22.54
thresholds for pest/disease control	16	9.25	55	31.79
mgmt. diseases in general	12	6.94	67	38.73
pesticide application technology	12	6.94	79	45.66
DSS apple scab (Venturia inaequalis)	11	6.36	90	52.02
mgmt. pests in general	10	5.78	100	57.80
pesticide residue levels	10	5.78	110	63.58
forecasting tools for apple scab	9	5.20	119	68.79
env. impact of relevant pesticides	7	4.05	126	72.83
pesticide resistance prevention	7	4.05	133	76.88
crop mgmt. organic production	6	3.47	139	80.35
monitoring tools for codling moth	5	2.89	144	83.24
others	5	2.89	149	86.13
DSS codling moth (Cydia pomonella)	4	2.31	153	88.44
mgmt. weeds in general	4	2.31	157	90.75
alternative methods for pest and weed control	3	1.73	160	92.49
disease resistant apple varieties	3	1.73	163	94.22
mgmt. of apple scab	3	1.73	166	95.95
non-chemical alternative measures	3	1.73	169	97.69
biological control methods in apples	2	1.16	171	98.84

Q5.3 Most important topics regarding apples				
Crop protection topic	**Frequency**	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
mgmt. of Nectria canker	1	0.58	172	99.42
mgmt. of codling moth	1	0.58	173	100.00

Below, the priorities regarding Q5.3 are grouped after country. The numbers in cells are column frequencies:

Q5.3 Most important topics apples	Country				
	Denmark	**The Netherlands**	**Germany**	**United Kingdom**	**France**
apples not relevant for me	16.33	13.33	16.67	50.00	30.43
thresholds for pest/disease control	8.16	13.33	6.67	0.00	17.39
mgmt. diseases in general	8.16	6.67	6.67	3.85	8.70
pesticide application technology	6.12	8.89	6.67	7.69	4.35
DSS apple scab (Venturia inaequalis)	6.12	11.11	6.67	3.85	0.00
mgmt. pests in general	6.12	6.67	6.67	3.85	4.35
pesticide residue levels	6.12	2.22	6.67	7.69	8.70
forecasting tools for apple scab	4.08	6.67	10.00	3.85	0.00
env. impact of relevant pesticides	4.08	2.22	3.33	3.85	8.70
pesticide resistance prevention	4.08	4.44	6.67	0.00	4.35
crop mgmt. organic	6.12	2.22	3.33	3.85	0.00

monitoring tools for codling moth	4.08	0.00	6.67	3.85	0.00
others	2.04	6.67	0.00	0.00	4.35
DSS codling moth (Cydia pomonella)	0.00	4.44	3.33	3.85	0.00
mgmt. weeds in general	2.04	2.22	0.00	3.85	4.35
alternative methods for pest and weed control	4.08	0.00	0.00	0.00	4.35
disease resistant apple varieties	4.08	2.22	0.00	0.00	0.00
mgmt. of apple scab	2.04	2.22	3.33	0.00	0.00
non-chemical alternative measures	4.08	2.22	0.00	0.00	0.00
biological control methods in apples	2.04	0.00	3.33	0.00	0.00
mgmt. of Nectria canker	0.00	2.22	0.00	0.00	0.00

Q5.3
Other important crop protection topics to be covered by EPC with regard to apples

- biological control of pests
- "grapevigne : - Technique alternative au désherbage chimique en vigne"
- influence of untilled areas
- several diseases (perenbladvlo, vruchtrot, brown spot on pear)
- how to protect worms

14 Questionnaire Section 6 – Winding up

Q6.1
Do you want to raise any other issues with regard to sustainable crop protection, the European Pest Control Competence Centre or ENDURE?

Researchers (12):
Advisor for farm advisors (10):
Farm advisors (9):
Farmers (9):
Input suppliers (5):
Interest groups (5):
Government officers (3):
Trader/processors (3):
Others (10):