



LIFE08 ENV/FIN/000604

FINAL Report

Covering the project activities from 01/01/2010 to 31/12/2013

Reporting Date
31/03/2014

Reducing environmental risks in use of plant protection products in Northern Europe - PesticideLife

Data Project	
Project location	Finland
Project start date:	01/01/2010
Project end date:	31/12/2013
Total Project duration (in months)	48
Total budget	1 024 432 €
Total eligible budget	1 021 932 €
EC contribution:	510 965 €
(%) of total costs	49.88 % of total budget
(%) of eligible costs	50.00 % of total eligible budget

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2 Executive summary

The objectives

The objectives of the PesticideLife project were to specify actions for the National Action Plan (NAP), supporting the EU's directive (2009/128/EC) on sustainable use of pesticides, and to construct and test methods of Integrated Pest Management (IPM). Different options for the determination of the ecological risk mitigation of plant protection products were studied in the project, too. IPM methods were tested and developed in co-operation with farmers. One objective of the project was to assure that the changes in climate, land use and agricultural techniques will be taken into account in the NAP planning and implementing. Cereals were used as demonstrative model crops of the project. The results were aimed to extrapolate from a regional scale to the Nordic-Baltic growing areas. The specific challenge of the project was to build up the wide involvement of stakeholders for developing process of the upcoming NAP and to catch transparency and wide acceptability to this process. The problem targeted by us was the major contradictions between the EU requirements to minimize the dependency on pesticides, when simultaneously the trend is the increasing dependency on pesticides, particularly linked to changes in climate, land use and cultivation technology in the northern crop production areas.

Key deliverables and outputs

Key deliverable of the Action 1 (PARTNER) was the policy review. Our aim was to list and describe the numerous policy documents, directives and regulations that should be known by experts developing IPM. The first policy review was completed and published on the website on 28.5.2010. After analysis of comments the final version was published on MTT's publication series as 'MTT Raportti 20' on 15.3.2011 both in web and paper. Policy review was delivered to the expert team working on the National Action Plan on the sustainable use of pesticides in Finland. The updated version of the Policy review was published electronically in September 2013, likewise in MTT Report –series.

Publishing work has been active in the Action 2, and by the end of the project six reports were published. Three of them were published in the MTT's Report series and three were published on the PesticideLife website. Five of these reports are targeted at the Finnish farmers and the language is Finnish. Four of these reports summarize the results of the farm demonstrations and one report is focused in theme of the risk management in plant protection. One report, concerning the fungicide resistance situation in Finland, is targeted at Nordic-Baltic audience and its language is English. The Action 2 has exceeded its goals by publishing two extra reports and three poster summaries about the management of pesticide resistance. PesticideLife has published on its web sites a wide information package about the IPM in cereal production.

In Action 4 the main deliverables are two reports written in English and concerning the environmental and ecotoxicological issues of pesticides. The first report "How to measure the environmental risks from uses of plant protection products for achieving the IPM requirements and risk communication" was published in June 2013 and shared to the main experts in this field in Finland but also in EU. The second report "A synthesis report on implementation of IPM and demonstrating the aquatic risks of plant protection products on a Nordic-Baltic scale" was published in November 2013. HAIR risk indicators, developed in the EU, were used in research for the first time in Finland and even more extensively in Europe. The new procedure has been described in the report and it can be further developed

by authorities which are measuring the change in the risks caused by pesticides once IPM is introduced.

Dissemination work in the Action 5 has been very active. PesticideLife has organized 3 national and 2 international seminars, 9 regional field days and the project attended in several seminars, exhibitions and other events. The project specialists have been speakers in numerous events with 154 presentations, including tasks of an expert in the law-based plant protection education. Number of the articles in printed media is over 35 and the project has published more than 10 posters for disseminating the project results. PesticideLife has produced three IPM-videos for educational purposes. These can be found from project's website. Project's website has been in active use and the number of visitors has been up to 2500 per month. PesticideLife has been active also in social media via Facebook and Blog.

The Management system (Action 6 Management)

The coordinating beneficiary of the project was MTT Agrifood Research Finland. The other two project partners were Nylands Svenska Lantbrukssällskap (NSL) and Finnish Safety and Chemicals Agency (Tukes). Project management was carried out by the coordinating beneficiary, MTT Plant Production. The Project Manager Sanni Junnila was responsible to project management and ensured, that project followed the regulations of Life+, national legislation and the project plan. Project Manager has taken responsibility of the schedules of the milestones and deliverables. Senior Supervisor Kari Tiilikkala has led the Management Board meetings (15 in total) where Project Manager was a secretary. The project management, dissemination efforts and other activities concerning project progress have been discussed in these meetings. Project team has had 1 – 4 team meetings per month. Financial Secretary Taru Könkö has taken care of financial issues and reported to the Project Manager. Internal Monitor has followed the project management issues having meetings with the staff regularly and visiting all the Management Board meetings in 2012-2013.

The project management process ran creditably during the project. The management has supported successful planning and implementation of project's tasks according to the project plan. Both project partners met all expectations and their role was essential in fulfilling the project targets. There were no deviations from arrangements contained in the partnership agreements. Law-based organizational change of the project partner from SYKE to Tukes from the beginning of 2011 onwards caused the only Supplementary Agreement during the project period. The change did not cause any problems to the project management nor affected the projects timetables or outputs. All Technical reports were completed and delivered to Commission in time.

Main results of the actions

Action 1 PARTNER

The policy review was completed and published on the website on 28.5.2010. Since publishing the first policy review, the guidelines of CAP and national pesticide use legislation changed. These changes have been taken in consideration in the updated version of the Policy review that was published electronically in September 2013 in MTT Report series.

Farmer collaboration agreements with the demonstration farmers (three per each area, 9 altogether) were signed and sent to the Commission in the late summer 2009. In addition, 32

Farmer Agreements were done with the voluntary farmers who wanted to test IPM methods in their farms.

One goal of the Action 1 was to build a stakeholder partnership in agricultural and food sector. Stakeholder collaboration agreements were signed with two companies (Berner Ltd, a pesticide trade; and Raisio Plc, a food company) in the late summer 2009. The role of the stakeholders was to provide information and support without costs to the project in several actions. Other interest groups (authorities, research, advice, sale, NGOs, teaching, students) have been attending to the seminars, field days and other events. Although the stakeholder networking has been active, the project plan could not be followed here literally. According to the project plan, we should have built about 25 stakeholders network with regular meetings in every 3 months. We were able to achieve our goal in building an extensive and representative network, but it was not realistic or motivating to maintain the regular meetings in every 3 months.

NGO Plant protection society, called KSS signed a collaboration agreement already in summer 2009. KSS is a nationally important actor, communicator and information provider in plant protection sector. KSS organizes yearly two seminar days related to plant protection issues and PesticideLife has had presentations in all those seminars in the years 2010-2013. One of the seminars was held on 1.11.2011 as a joint seminar of PesticideLife (mid-term seminar) and KSS (Syyspuinti, "Autumn harvest Day"). Cooperation with KSS has also been regular in building the web based IPM portal during 2013. The goal was to build a demo version of the portal that would include permanent information about pests (insects, weeds and diseases) and IPM in different crops. After intensive planning, building and testing work the demo version of the portal was ready by the end of year 2013. The version targeted to the cereal farmers contains information about the IPM of different pests in barley. Portal has been in the farm-scale test use within the demonstration farmers, and the feedback has been positive and encouraging to the further development. In the future the role of IPM portal as source of information may be great and it will secure information delivery after the end of this project.

Action 2 IPM

The aim of the Action 2 was to test and develop IPM methods for the NAP. Scenarios for pest threatened crop systems were evaluated and researched annually, in total three times, by the weed, insect and plant disease specialists nominated into the project. The scenarios and control thresholds have been updated according to the results of previous years. The results of each year's demonstrations were reported at farm, year and research area level in the end of each year and discussed in the yearly meetings at each three local areas in following January-February.

In chemical control demonstrations, project concentrated on measuring the situations when chemical control is needed and what are the economical benefits or losses of different applications. The most important non-chemical control methods were crop rotation and plowing from tilling methods. The main finding in comparison of tilling methods was that grass-type weeds become more common in no-tillage fields, and thus farmers need to pay attention to control of grassy weeds. Disease management by crop rotation and/or with fungicides is also important in low-tillage systems, where survival of pathogen spores is higher compared to ploughing. Demonstrations were a good base for developing IPM methods in practice, and cooperation with farmers, research and advisory services will be continued. Different IPM methods were reviewed in MTT's report 107 "defined benefits and

weaknesses of different IPM methods”. Demonstration farmers have learned to avoid especially unnecessary pesticide sprays. However, control thresholds were not always followed, even though they would have been exceeded. Crop diversification is a key element of IPM. The results of the demonstrations have been delivered to the NAP working group.

Two demonstration fields at Jokioisten Kartanot are long-term and large-scale research fields on a) conventional tillage (ploughing) versus no-tillage and b) no-tillage with buffer zones. Both fields have been treated quite regularly with glyphosate, and water samples of the subsurface drainage water have been collected twice per snow melting period in 2010 and in 2011 to assess the amount of glyphosate and AMPA run-off to water bodies. These samples were analysed in autumn 2013 and some results were reported in connection with Action 4 task 3 report.

Novel cereal leaf spot disease forecasting model was tested and evaluated in practice in every demonstration farm of the project, altogether in 27 cereal fields in the growing seasons 2010-2012. The demonstrations gave very valuable information for the disease forecast calibration. Forecasting model was forwarded in a commercial application WisuEnnuste in 2012 and is now available for all farmers and advisors. In addition to the plant disease forecasting model, bird cherry aphid risk was also forecasted and information disseminated in MTT Kasper service.

Publication work in the Action 2 has been active and, in addition to reports mentioned in project plan, project has published 2 additional reports both electronically and as hard copies and also other material to support the IPM communication. As a part of development work of new IPM tools, PesticideLife participated in development work of IPM portal. PesticideLife has also participated together with other IPM projects of MTT in IPM matrix-work. The aim of this matrix-working group is to collect all knowledge and show knowledge gaps considering the IPM methods in plant production and focus the research needed for the further development of IPM.

Action 4 COMPLY

Action 4 had three sub-tasks and results of these tasks were published in two reports in English. The aim of tasks 1 and 2 was to demonstrate the studies of environmental effects of plant protection products (PPP) into two ways: vertically and horizontally. In addition, this aim was linked with the EU strategy on the sustainable use of pesticides, where attempts are made to reduce the health and environmental risks via IPM.

The demonstration procedure of the environmental effects of plant protection products is a combination of two methods. The effects on the food chain were studied with ecotoxicity impact of life cycle analysis (LCA) in the vertical dimension. The effects on the landscape environment were studied with HAIR risk indicators, available in the EU, in the horizontal dimension. The results were published in MTT Report 105 “How to measure the environmental risks from uses of plant protection products for achieving the IPM requirements and risk communication”. The report is available online and the printed version was delivered to the main IPM experts in Finland but also in EU. In addition, the procedure was served for Finnish authorities to use it in the measurement of IPM development in the future.

Aim of the task 3 was to collaborate and implement IPM practices in cereals production and discuss the methods for measuring risks on aquatic systems on the Nordic-Baltic scale.

Collaboration and implementation were performed in order to find suitable experts for the network. This was a way to build up steady collaboration for the knowledge exchange, and initiate new activities under the auspices of available institutions. In addition, different events were organised and participated in, and information was shared. The results of this task were published online in report “A synthesis report on implementation of IPM and demonstrating the aquatic risks of plant protection products on a Nordic-Baltic scale”.

Knowledge of different experts working in different areas was successfully combined in this project. The publication work of this action has been active and generated over 30 different reports, articles, posters and presentations. Results were shared and communicated with the other researchers, experts, farmers and the public. The experts had willingness and competence to cross borderlines of teams and projects. These experiences will be shared in the collaboration between the Nordic-Baltic countries and even in larger scale. Collaboration and further research is urgently required in the future.

Action 5 DISSEMINATION

Publication and communication, organising seminars and participating in different events were the main tasks of the Action 5. The PesticideLife website provides information about the project, its objectives, actions, progress and results. Project’s web album, containing over 2000 photographs, can be found from the website. Project’s Facebook and Blog are also linked in the website. The averages of web visitors per month were 428 in Finnish site, 78 in English site and 14 visitors in Swedish site. All the products of the project are added or linked to the website, including e.g. educational IPM videos, all reports, notice boards, posters and brochures. The website offers a great baggage of IPM information, and the information has been actively marketed for the farmers, advisors and teachers in agricultural high schools.

PesticideLife has organized three seminars. The first, two-day’s opening seminar, was held in MTT Jokioinen. The mid-term seminar and closing seminars were divided into national and international parts. The international part of project’s mid-term seminar was held as a Nordic-Baltic IPM-workshop at the 24th NJF Congress in Ultuna, Sweden and the national part of the mid-term seminar was organized in co-operation with the KSS “Syyspuinti”-seminar in Ilmajoki, Finland. The international part of the closing seminar was arranged together with the NJF IPM working group in November 2012 in Tallinn and the national part of closing seminar was held at Jokioinen in November 2013. All seminars were successful and led to several hits in the media. Seminar materials, including presentations, were added to projects website. In addition to the seminars, PesticideLife arranged 9 field days during three summers. Field days reached good audience and led press hits in media.

Publication work has been active. Three project brochures and the Layman’s report were published according to the project plan in three languages (FI, SE, EN). The shooting of the IPM film was started in May 2012 and all three films were finalized in autumn 2013 and published in *Vimeo* video service on web and linked in project’s web page. Project has participated in numerous events in Finland and Europe with 154 presentations in total, including e.g. agricultural exhibitions and Green Week conferences in Bryssel in 2012 and 2013.

Action 7 MONITORING

Internal monitoring is successfully completed. Five reports in total have been presented to the Management Board by Internal Monitors Pasi Voutilainen (2010) and Pekka Manninen (2011-2013). The internal monitoring reports are confidential, and they are not presented at

the projects website. The Monitor evaluated that the PesticideLife project worked very well, and all beneficiaries were well experienced in project management and realization. According to the recommendations of Internal Monitor, risk assessment process of the PesticideLife project was implemented in 2012 and it was executed twice both in 2012 and 2013.

The evaluation of the project implementation

PesticideLife has followed the Grant Agreement successfully and all outputs and milestones have been completed and published in time. Some minor changes have been done after discussing with the monitoring team and Commission. These changes helped to reach the project goals and/or helped to reduce unnecessary economical and environmental costs or workload. Changes did not cause any delays or reduce the quality or content of the results. PesticideLife project has a clear linkage to the environmental policy of EU. The results of the project can be used in implementation of frame directive of sustainable use of pesticides (2009/128/EY) in national level. The project has produced knowledge for producing, implementation and updating of National Action Plan. Reducing the risks of pesticide use will support promoting the goals of the 7th environmental action program (EAP) of EU. The role of PesticideLife has been remarkable in educating new experts and educators to the field of IPM. After PesticideLife project, Finland has 10 new IPM experts ready to spread forward their knowledge in the field of sustainable plant protection. In long term we hope that all this information will be in wide use and the lack of knowledge is not an obstacle in utilizing IPM methods in farmer's work in cereal production. The open communication about the pesticide issues in the projects seminars and events will lead to increased understanding between the producer and consumer groups. The improvements in pest forecasting and observation methods will make adoption of the IPM methods easier in farm scale. In measuring environmental risks of pesticides, the HAIR-risk indicators were now first time applied and they have been offered for the authorities for long-term follow-up in the development of IPM implementation and environmental risks of pesticides.

Financial evaluation

In the Grant Agreement the portions of the budgeted costs of each cost category from the total costs were: personnel costs 82 %, travel 3 %, external assistance 13 % and consumables 2 %. The portions of realized costs after the project period were, respectively, 85 %, 3.6 %, 9,2 % and 0.6 %. In addition, new category named other costs was opened and it reached 1.6 % of total costs. In general, the budget was well planned and the realization of the budget was very close the planned. Main reason for the increase of personnel costs was the rise of salaries from the beginning of 2010 to 2013 by 22,5 % in total, according to the official state salary contracts. The main reason for exceeding the travel budget was more active and rich collaboration and networking with the experts at the Nordic-Baltic and European level than planned beforehand. Also the real travel costs were noticed to be clearly higher than estimated in the project plan. The changes in the total costs by Actions reflected naturally strongly the changes in the proportion of the personnel costs by Actions.

3 Introduction

The objective of the Thematic Strategy on the Sustainable Use of Pesticides (2006) is to reduce the risk caused by plant protection products to the environment and human health and to decrease dependency on the use of plant protection products. The Framework Directive on the sustainable use of pesticides implements the objectives of the strategy. This Directive requires that all professional farming must apply the general principles of integrated plant protection from 2014 onwards. In addition, the Directive requires that EU Member States draft a National Action Plan (NAP), regarding the use of pesticides. In Finland, the NAP was adopted in November 2012.

Plant protection is an important part of successful plant production. IPM combines different methods to restrict the development of pests and control them so that operations are economically justified. Preventive methods such as crop rotation, resistant varieties and soil cultivation methods are prioritized. In the control of pests, biological, physical and mechanical control actions take precedence when such actions can be implemented in an economically sustainable manner. Chemical plant protection is only the last mean of control. In such case, pests are controlled according to the need, while utilising observation, prediction methods and threshold values. The goal is to take care of the plant's health and produce a good and high-quality yield while taking the prevention of pesticide resistance into consideration and preventing pesticides from getting elsewhere in the environment such as water bodies. Approximately 9 % of Finland's surface area is water bodies that makes the risk of pesticide leaching very high. Due to the cold winters, chemicals may break down slowly in the environment and their environmental impacts can be unpredictable.

The objective of the PesticideLife project was to develop and test IPM methods and threshold values in cereal cultivation in cooperation with the farmers, and to produce and communicate information regarding IPM and its application both on a national level and in the northern cultivation zone that comprises the Nordic and Baltic countries. In addition, the objective was to utilise and develop co-operation networks between plant protection operators and apply NAP principles in cereal production. One work package of the project aimed to develop a new method to measure the environmental risks and impacts caused by the use of pesticides.

PesticideLife was a demonstration project that tested the methods of integrated pest management in a total of nine farms and 77 cereal fields in 2010-2012. So far, non-chemical plant protection methods are rare in cereal cultivation, so the measures concentrated on preventative control methods and detection of the need for chemical plant protection based on observations. In addition, the project tested the functionality and reliability of the *WisuEnnuste* plant disease forecasting model. The environmental risks of pesticides were measured by using two different models. The used material in measurements was Finnish cereal farmers' pesticide usage data from the year 2007. The data was collected in a pilot research of Tike (Information Centre of the Ministry of Agriculture and Forestry) for implementation of statistics directive of EU.

Expected results and environmental benefits

The farmers can reduce the negative environmental effects of the pesticide use by adopting the IPM methods in their work. PesticideLife has tested and validated IPM methods for crop production and the results have been published in the projects website. The project partner NSL is in close connection to the farmers. Via NSL's advising work and farmer field days the results of the project will spread out effectively. Also the plant protection experts of the MTT

will continue sharing PesticideLife-knowledge in various seminars, meetings and exhibitions. The activity in information sharing after the project is a key factor in the project's longer term success. During the January - February of 2014, the project team has had about ten presentations about the results of PesticideLife already. The project has made new connections between the operators and established new working groups which will continue IPM implementation after the project.

Expected long time results: The environmental and health risks caused by pesticide use will decrease when pesticides are used only for noted need. Farmers learned to use preventative methods and utilise forecast models and threshold values in their plant protection work. All operators in the area need each others to face the forthcoming challenges. The PesticideLife project and other IPM projects in Finland have proven the power of co-operation and benefits of learning together. Demonstrations on a farm level will also be an important part of IPM development that aims for comprehensive management of risks, testing and comparison of new methods and reduction of chemical dependency. Farmers, further processors and the whole production chain will benefit from this development when they have to prove the origin of products and the ecological and ethical sustainability of production methods to the consumers. IPM provides tools for consumer communication and sharing accurate information about the food production. The work that PesticideLife has started in Finland, will continue in various projects and in implementation of IPM. In national level, the results and knowledge of PesticideLife are already utilized for example in building IPM portal (coordinated by KSS), collecting IPM knowledge in Matrixes (by MTT), implementing IPM in new law based plant protection education (Tukes) and updating the national action plan (MMM). In international level, the IPM Working Group of NJF and ENDURE will connect the Nordic-Baltic IPM knowledge and expertise.

The main goal of the project was to produce information how to adopt the new plant protection regulations based on new EU pesticide legislation without decreasing the possibilities for economically and environmentally sustainable farming. The results of the project will be utilized in implementation and updating of National Action Plan (NAP) and will support both national and Nordic-Baltic level implementation of EU's environmental policy concerning the sustainable use of pesticides.

4 Administrative part

4.1 Description of the management system

Description of working method

Project management was carried out by the coordinating beneficiary, MTT Plant Production. The Project Manager Sanni Junnila was responsible of the project management and ensured, that project followed the regulations of Life+ and national legislation and the project plan. Project Manager has taken responsibility of the schedules of the milestones and deliverables. Together with the Project Expert and Senior Supervisor she has been taking care of the new recruitments and staff specifically seconded to the project. The timesheet model with working hours indicated to specific actions is made electronically only from the beginning of 2012 onwards. The partners Tukes (SYKE) and NSL are taking care of the timesheets of their personnel. Senior Supervisor has led the Management Board meetings (15 in total) where Project Manager was a secretary.

All the partners of the project have been trained for the financial reporting and the Financial Secretary together with the Project Manager guides the beneficiaries to ensure congruence between the partners in the financial report. The Management Board and the project team have been established according to the project plan. Managerial documentation of the project is identifiable and gathered in an electronic database. Hard copies are filed and identified as such. Inception, mid-term and progress reports have been delivered as scheduled.

Financial Secretary has taken care of financial issues and reported to the Project Manager. Internal Monitor has followed the project management issues having meetings with the staff regularly and visiting all the Management Board meetings in 2012-2013.

The draft of the Partnership Agreement (please see chapter “Partnership Agreement status and key contents”) was prepared together with the lawyer of MTT and it was delivered to the partners in the project team meeting, where also the administrative sheets, rules and other information were released and discussed. A new partnership agreement has been signed according to the changes in the project associated beneficiaries.

The only amendment to the Grant Agreement for the project LIFE08 ENV/FIN/000604 was signed on 10.6.2011. The supplementary agreement concerned the substitution of the project partner SYKE, the Finnish Environment Institute by the Finnish Safety and Chemicals Agency TUKES. The replacement is indicated in the attachments of the Supplementary Agreement no 1 (forms A1, A4/1 and A5/1, FC and C1). All other provisions of the Grant Agreement and its annexes remained unchanged, and no delay was caused due to the change.

The deliverable products and milestones have been done as scheduled in the project plan. Schematic presentation of the project phases and activities per phase is presented in Gant Chart, FR ANNEX 1.

Presentation of coordinating beneficiary, project partners and organization

The coordinating beneficiary, MTT Agrifood Research Finland, is a leading research institute developing sustainability and competitiveness of the food system in Finland. MTT conducts research within five research areas which utilize the expertise of the entire organization. Operating under the Ministry of Agriculture and Forestry, MTT employs around 750 people at 15 locations across Finland. MTT's head office is situated at Jokioinen, a 1.5-hour drive from Helsinki, the capital of Finland. MTT's share of the project budgeted is about 93 %.

PesticideLife -project had two project partners. Nylands Svenska Lantbrukssällskap, NSL, is an agricultural advisor organization that works in region of Swedish-speaking area of Uusimaa. NSL provides advisory services for plant production and economical planning. Advisory work is based on direct contact with the farmer on the farm. NLS is a part of ProAgria-group that is a leading agricultural advising organization in Finland. Via NSL PesticideLife project was connected to ProAgria organization. NSL was the leader of Action 1 (Partnership). The organisation has had an active role in recruiting farmers in farmer co-operation. NSL has also been actively arranging field days and presenting the project there. NSL's share of project budgeted was about 4 %.

Project partner SYKE has been replaced by Tukes from 1.1.2011 according to a Finnish law (please see MR 4.2. Project partner SYKE replaced by Tukes). Tukes is the Finnish national agency responsible for the chemicals surveillance and an important partner of the European Chemicals Agency (ECHA). Tukes was responsible for drafting and executing the National Action Plan in collaboration with plant protection professionals and public authorities. Tukes (SYKE in 2010) have been contributing on water issues and legislation in the opening seminar, mid-term seminar and policy review. Tukes has had an active role in writing reports of ACTION 4 (COMPLY). Tukes's share of project budgeted was about 3 %.

Organigramme of the project team and the project management structure

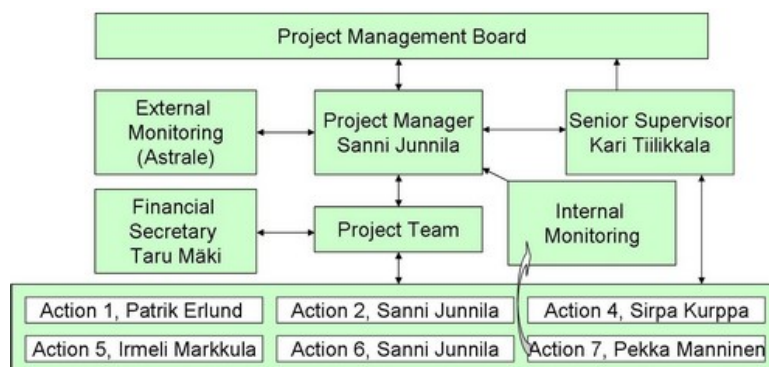


Figure 1. Organigramme of the project PesticideLife.

The project was assembled by the five action coordinators (Patrik Erlund, Sirpa Kurppa, Irmeli Markkula, Sanni Junnila and Pekka Manninen) and the Financial Secretary at MTT (Taru Könkö). Project Manager acted as a chairperson in the project team. The project team was the main operative and technical organ and reported to the Management Board via Project Manager (Figure 1). The Management Board consisted of Project Manager, Senior Supervisor and representatives of project partners, and it has assembled to assure appropriate performance of the project. It's role was to support the Project Manager in her work.

Management board and team meetings

The project management, dissemination efforts and other activities concerning project progress have been discussed in the regular meetings of the Management Board. According to the project plan, Management Board had 4 meetings per year, and the total number of meetings was fifteen. The first meeting of Management Board was arranged together with the opening seminar at MTT in Jokioinen. From the beginning of 2011 the meetings were organised as video conferences in order to decrease travelling and reduce environmental influences e.g. the amount of the CO₂ emissions.

According to the project plan the project team should have met once every month. The amount of project team meetings was reduced by Management Board from twelve to about 6 per year. Anyway, from the spring 2012 the project team meetings were increased to 1-4 meetings per month. The increase of the regular meetings was to be found very important because after the re-organization of MTT's premises the key persons of the project were located in different buildings of the campus having no daily contacts anymore. The weekly meetings were organized e. g. in order to improve project coordination and joint writing of the reports. The records of the team meetings were saved in the electronic Wiki-workspace where every member of the team had an access.

Partnership Agreements status and key content

Partnership Agreement was signed by the coordinating beneficiary (MTT 12.5.2010) and the partners (SYKE 26.5.2010 and NSL 17.5.2010), and it has been delivered with annexes to the partners and to the Commission (IR ANNEX 1). New partnership agreement has been signed by the beneficiaries (MTT 21.3.2011, Tukes 18.3.2011 and NSL 18.3.2011) and delivered to the Commission as APPENDIX 2 of the Supplementary Agreement (8.4.2011). This Agreement was signed by the Commission and the coordinating beneficiary on 10.6.2011. New partnership agreement has been. Key contents of the partnership agreement are the definition of parties as well as their responsibilities in the project implementation, duration of Grant Agreement, payment terms and financial contributions. Partnership Agreement contains also information about reporting to the Commission.

Changes in the project's management structure

The change of the project partner from SYKE (The Finnish Environment Institute) to Tukes (Finnish Safety and Chemicals Agency) caused first and only need for an amendment to the Grand Agreement of PesticideLife. The amendment was signed on 10.6.2011. The change was based on Finnish law and it is described more detailed in MR report and its annexes. The change did not cause any delays to the project.

Changes in project staff: The Project Expert Pauliina Laitinen took up an appointment as a coordinator of the Finnish National Action Plan at Tukes, from 1st of February 2012. The new Project Expert Aino-Maija Mustalahti (later: Alanko) started 15th of February 2012. Aino-Maija Alanko took a vacancy as a Senior Inspector in Evira, Finnish Food Safety Authority from the beginning of March 2013. The third Project Expert Taina Mäkinen started 15th of April 2013. The changes did not affect the results or outputs or the timely completion of the project. New researchers have been seconded to the project. Two new researchers started in the beginning of the year 2012: LCA expert Kati Räsänen (from 1.3.2012) and GIS-specialist Riikka Nousiainen from 1.1.2012. Researcher Sari Rämö was seconded to the project for one month period in the autumn 2013. Her assignment was to analyze glyphosate and AMPA

residues from the water samples taken from drainpipe waters of two demonstration fields in Jokioinen.

Other changes: Financial secretary Taru Mäki changed her last name to Könkö (2013). Member of Management Board Arjo Kangas passed away and was replaced by his substitute Tapio Kujala (2013). Internal Monitor Pasi Voutilainen was replaced by Pekka Manninen (2011). External monitor Pekka Hänninen was replaced first by Joonas Alaranta (2012) and then by Milka Parviainen (2013). Manager of project partner NSL, Leif Karlsson was replaced by Henrik Lassas (2012).

4.2 Evaluation of the management system

Project management process

The project management process ran creditably during the project. The management has supported successful planning and implementation of project's tasks according to the project plan. Both project partners met all expectations and their role was essential in fulfilling the project targets. There were no significant deviations from arrangements contained in the Partnership Agreements. Only change was law-based organizational change of the project partner from SYKE to Tukes (more detailed in MR report and its annexes). The change did not cause any problems to the project management nor affected the projects timetables or outputs. All Technical reports are completed and delivered to Commission in time. (IR 31.08.2010, MR 23.12.2011, PR 31.01.2013, FR 31.3.2014)

Communication with Commission and Monitor Team

During the project period there were three different persons as representative of Astrale Monitor Team. After Mr. Pekka Hänninen Mr. Joonas Alaranta worked with us from autumn 2011 to summer 2013, when Ms. Milka Parviainen started. The monitor has visited our project 4.5.2010, 13.9.2010, 28.6.2011, 15.12.2011, 13.11.2012 and 20.2.2014. Negotiations at meetings have made sure and facilitated the performance of project and increased its quality. Especially when preparing the technical reports the tight discussions with the monitor have been essential in the quality of the reports.

All communication with Commission has happened via Monitor Team or after discussion with monitor. We have invited the representative of Commission into three of our seminars. We have asked twice advice about some smaller deviations via e-mail from Commission and got answers 24.10.2012 (F. Nogara) and 1.10.2013 (G. Carboni). Technical desk officer Mr. Nogara and financial desk officer Ms. Ver Eycken inspected the project 28.6.2011.

5 Technical part

5.1 Technical progress

This section concerns all project tasks except project management (Action 6) and dissemination (Action 5) that are dealt in the action specific sections.

5.1.1 Action 1 Assessment of the strategic and operative Framework to NAP development – with special focus on IPM actions (PARTNERSHIP)

Table 1. Deliverables and milestones of Action 1, partnership.

Name of the Deliverable or Milestone	Deadline	Category	Status and delivery to the COM (if relevant)	In charge /done by
Farm collaboration agreements reached	31.3.2010	M	Completed in June and July 2009, delivered in autumn 2009	PM
Policy review report	31.5.2010 update 29.9.2013	D, M	Completed on 28.5.2010, public at the project's website (IR ANNEX 2). Update continued through the project duration; new version was attached as MR ANNEX 2 The final update completed and published online in MTT Report –series, publication no 20, 29.9.2013 (FR ANNEX 2)	PE, PS PE
Mutual intranet database for compiled tools to support IPM and ecological risk review	30.6.2010	D	Completed; Intranet/extranet portal opened 28.6.2010	PE
Activity of the stakeholder network started	30.6.2010	M	Started before 30.6.2010. Continued through project duration.	PM, PE, PS
Activity of the network of external reference groups built and activities started	30.8.2010	M	Networking started at the opening seminar on 18.-19.2.2010; continuing until the end of the project.	PM, PE, PS
Compiled public information material linked to MTT and TUKES portals.	30.9.2010	D	Completed: Project's short description and website linked to SYKE-portal 27.4.2010; removed to TUKES-portal in January 2012.	PE

In charge/done by: PM=Project Manager, PE=Project Expert, PS=Project Staff
Category: M=milestone, D=deliverable

Realisation of the tasks of Action 1

1. Policy review

All beneficiaries have been preparing the policy review that was completed and published on the website on 28.5.2010 (IR ANNEX 2). The policy review was commented by stakeholders and the expert group preparing the NAP of Finland and the final version was published in March 2011 (MR ANNEX 2, in Finnish, with summary in English and Swedish). The report was published on MTT's publication series as a 'MTT Raportti 20' on 15.3.2011 both on the web and paper. Policy review was delivered to the seminar audience of the national mid-term seminar. Since publishing of the first policy review, we have; a) actively followed the discussion of upcoming CAP changes in the EU, b) how EU's environmental support conditions and green agriculture are going to be changed. All the changes will affect on the IPM implementation. Pesticide use legislation has changed after spring 2011 and also these changes have been taken in consideration in updated version of the Policy review that was published electronically in September 2013 in MTT Report –series (as an updated version of 'MTT Raportti 20', FR ANNEX 2). In addition to our own team's expertise, we consulted CAP specialist from Ministry of Agriculture and Forestry of Finland and plant health specialists of Evira. Both of the Policy reports can be found from the projects website.

2. Involvement of farmers

a) Farmer collaboration agreements of demonstration farms (three of each area, 9 altogether) were signed and sent to the EC in the late summer 2009. All collaborative farmers participated in the opening seminar.

According to the project plan 10-30 collaboration farmer agreements should have been signed per year. In the first project year 2010 there was a lack of collaboration farmer agreements (FA) due to misunderstanding of the project proposal. In mid-term report we asked and got permission to change the originally planned 10-30 FA per year to 30-90 FA's in total. We have taken special notice to reach this set goal, as it was reminded in the feedback of MR (2.5.2012). In 2011 collaboration was made in addition to demonstration farmers with 8 agricultural school farms which were testing the novel plant disease forecasting model. In 2012, 11 farmers signed the agreement and after farmer meeting in February 2013, new agreements were made with 14 farmers. After active marketing we reached the planned number of farmer agreements, total number of FA's was 32 by the beginning of the growing season 2013. Especially project partner NSL was very active in recruiting new farmers for farmer agreements. (2011 FA MR ANNEX 1, 2012 FA PR ANNEX 1, 2013 FA FR ANNEX 3). In various events we have met thousands of farmers.

In autumn 2012 feedback questionnaire was send by e-mail to demonstration farmers and collaboration farmers (FA). The farmers were asked why they chose IPM, what experiences they have and what should be done to improve the IPM communication. In the answers, the economical reasons and personal interest were the most common reasons for choosing IPM. They evaluated that they had learned to decrease unnecessary sprayings, but observation of pests was experienced to be challenging and more information about the identification of pest was needed. In general, more information about the IPM was needed and communication should concentrate more to inform about the positive sides of the IPM. The survey is described more detailed in MTT Report 108, page 37 (FR ANNEX 9). In the end of FA

meeting arranged 8.2.2013 we asked the farmers to evaluate the implementation grade of IPM in their farms with scale 0-10. The collaboration farmers signed the collaboration agreement already in 2012 (6 farmers) gave the value 8.5 but the new farmers (5) evaluated their implementation grade to be only 6.25. This showed well the importance of training and commitment for the implementation of IPM.

b) Intranet portal

Project information and link to project's website is added to Tukes website (<http://www.tukes.fi/Tiedostot/Kemikaalituotteet/kasvinsuojeluaineet/PesticideLife-hanke.fi.pdf>). Tukes coordinates the implementation of NAP. Basic information about PesticideLife-project and link to the projects home pages was added also to NSL portal. (<http://www.nsl.fi/2014/02/minimierung-av-vaxtskyddsmedlens-miljorisker-i-nordliga-forhallanden-pesticidelife/>). NLS is a part of ProAgria-group and via NSL PesticideLife is straight connected to the ProAgria.

c) Report on process description and success

Report has been presented in table of deliverable products of the project action 2, see project plan part C page 15. The report has been published online in projects website on 31.12.2012 and it is described more detailed in connection of task 2, page 26 FR.

3. Internal involvement of the stakeholders and tools

a) Stakeholder collaboration agreements: Stakeholder collaboration agreements were signed with two companies (Berner Ltd, a pesticide trade; and Raisio Plc, a food company) in the late summer 2009. The role of the stakeholders was to provide information and support with no costs to the project in several actions. Both collaborative stakeholders have been attending to the seminars and presenting information relevant to their subject and their expertise, and farmer network has been used in implementation of tasks of ACTION 1. Other interest groups (authorities, research, advice, sale, NGOs, teaching, students) have been attending to the seminars and field days. In addition to farmers, there were 29 stakeholders from 19 interest groups in the Opening Seminar and there were 65 stakeholders from 15 interest groups (e.g. from advisory services, research, authorities, agricultural trade) and nearly 100 students in the national mid-term seminar. Also the closing seminar achieved its goal in bringing together stakeholders from various interest groups.

In the mid-term report feedback we were asked to provide more information in FR about the collaboration with the companies (MR feedback 2.5.2012). Finnish companies importing and selling pesticides were invited to two workshops in November 2012. Workshops dealt with developing the ecotoxicological footprint of plant protection products. All invited stakeholders except RaisioAgro were presented. With Berner we have had cooperation in different events and we got their feedback about IPM from plant protection product trade's point of view. Berner organized a field day concerning field research and demonstrations of sulfonylurea-herbicide resistance in cereals. In this event project weed experts discussed this threatening future. The disease specialist of the project demonstrated cereal diseases in the fields in many events in 2013. In August 2011 and 2012 PesticideLife participated and project specialists had presentations in "Elonkierros"-field days organized by Raisio Agro. Although the stakeholder networking has been active, the project plan could not be followed literally. According to the project plan, we should have built about 25 stakeholders network that should have regular meetings in every 3 months. We were able to achieve our goal in building an

extensive and representative network, but it was not realistic or motivated to maintain the regular meetings in every 3 months.

b) Mutual intranet portal and database was updated to situate in touch with MTT's own intranet. This portal/database is called project's workspace ('Työtila' in Finnish) and it works with the password. User rights to the workspace were given to all project partners. Workspace was easy to update and it also included discussion forum. Mutual intranet portal includes information on project documents and fulfilled the need to share internal material with project partners. All memos of project team meetings were saved in the workspace. Project staff had access to MTT's internal network drive (J-drive) where all the essential documents were stored. Farmers got all the information via e-mail or the project website. Improved data management helped to avoid the updating files into several locations. Google Documents or Google Drive cloud service were used as mutual intranet database which intensified real-time collaboration and online editing of many documents, including the ecotoxicological risk review, produced in 2013.

General development of databases and internet services has been fast, and many changes have happened during the four project years. The Google Docs was introduced as a new tool for report writing in 2012. In many cases, this internet based service was more practical to use in joint writing and editing of reports than the originally established mutual intranet portal workspace. In internet based systems there are always some information security risks, which were taken account in working with cloud services.

4. Involvement of external reference groups

a) NGO Plant protection society, called KSS signed a collaboration agreement already in summer 2009. KSS commented the first policy document. KSS has also delivered public information about the PesticideLife project via the website of the society. KSS organises yearly two national seminar days related to plant protection issues ("Kasvinsuojelupäivä" in January and "Syyspuinti" in November). The project has been presented in all of those seminars. One of them was held on 1.11.2011 as a joint seminar of PesticideLife (mid-term seminar) and KSS (Syyspuinti). There are normally around 100–150 participants from the whole plant protection field of activities at the KSS seminars; also Swedish speaking participants have attended. The project was presented and discussed also on the Stakeholder's day organized by MTT's plant protection team (68 participants) in 2010.

Cooperation with KSS has been regular in building the web based IPM portal during 2013. PesticideLife has participated in development of a new IPM portal. The main actors in the development procedure were MTT's IPM projects' members (IPM-APU, PesticideLife and VIPM; please read more about the other projects from MR 5.3 IMPACT), KSS and Tukes. The goal was to build a demo version of the portal, that could serve different target and user groups; 1) consumers, 2) farmers, 3) research and 4) advice. The plan was to build a portal that would include permanent information about integrated pest management in different crops and pests (insects, weeds and diseases). The crop and/or sector specific IPM guidelines will also be published in the portal, supporting the awareness building and dissemination actions for the NAP. The idea was to build the portal so, that the users could customize their own interface, e.g. cereal farmer gets only information of cereals and not vegetables or greenhouse ornamentals. The users could upload relevant and timely IPM or pest information

and share it with other users, which is participatory sensing. Please read more about participatory sensing in MR ACTION 2, task 3.

The aim to build a practical and functioning IPM portal that could serve the needs mentioned above was proven very challenging to put into practice in planned time of the three IPM projects. During the year 2013 we had 11 planning and developing meetings with KSS and other members of the procedure concerning the IPM portal and by the end of the year the demo version of portal was ready (Figure 2). The demo version that is targeted to the cereal farmers contains information about the IPM of the different pests of barley. Barley was chosen to demonstrate the IPM needs of cereal production. The portal has been in farm-scale test use within the demonstration farmers, and the feedback has been positive and encouraging to the further development. In the future the role of IPM-portal as source of information may be great and it will secure information delivery after the end of this project. (Description of the portal work, FR ANNEX 4).

PesticideLife participated in 11th of October 2013 IPM-portal seminar and workshop that was organized by IPM-APU project. The seminar was held in MTT, Jokioinen and it caught up an extensive audience, representing many interest groups like representatives of farmers, advisor organizations, authorities, research institutes, trade organizations, education and industry. The aim of the seminar was to bring the IPM portal from the visions to the practice. PesticideLife had a seminar presentation and some of project specialists took actively part of seminar workshops. The seminar and the workshops aroused lively conversation about the need and the future of building IPM portal. The Permanent Secretary of Ministry of Agriculture and Forestry of Finland, Mrs Jaana Husu-Kallio participated the seminar and she underlined that correct and current information sharing about the pesticide use is very important and also in point of few of consumers. IPM-portal will serve also this function.

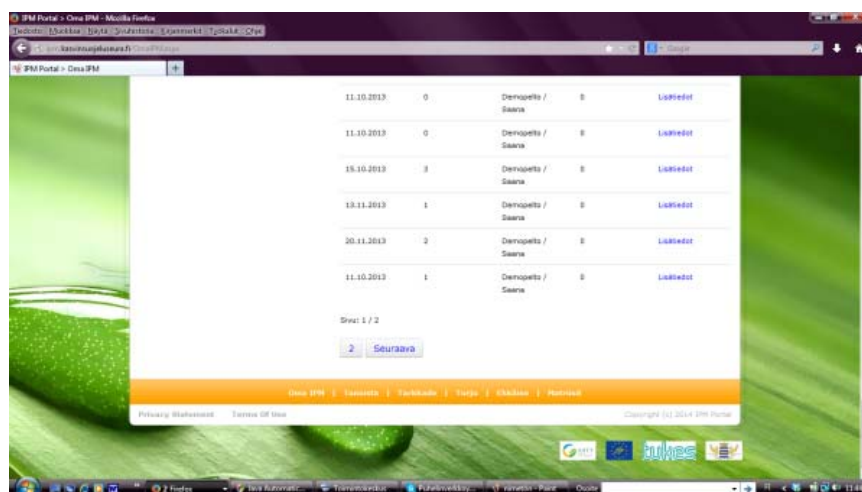


Figure 2. The picture of the screen of Demo version of IPM portal. Portal web page is bearing EU Life logo. Web address is ipm.kasvinsuojeluseura.fi (Username: Ohrademo. Password: Ohrademo).

Discussion on the IPM principles has been expanded also to vegetable production in collaboration with other IPM projects. Co-operation with MTT's other IPM projects has been very active. National IPM seminar was arranged in 21st of November 2012 in Jyväskylä. Project had there both presentation and posters. Project representatives took actively part in the workshops. In this seminar also consumer organisation was present and active in discussions. Project was also involved in SDL-Inno project coordinated by VTT. Target is to

make innovation processes faster. Our project was also present in the education workshops organized by Tukes in 2013. Education required in the NAP implementation was planned and realized from September 2013 onwards.

There have been no regular meetings or networks like planned in the project plan. However, the realized networking with many external reference groups has been comprehensive during the project period.

5.1.2 Action 2 Development of IPM methods for NAP (IPM)

Table 2. Deliverables and milestones of Action 2

Name of the Deliverable or Milestone	Deadline	Category	Status	In charge/done by
Preliminary scenarios of the upcoming PP needs built and reported and 1st round of control threshold reported	30.4.2010	M	Completed 1.4.2010. IR ANNEX 4	PSP, PM, PE
First round of test and demonstrations reported and first round of back-casting (3 years) reported	31.12.2010	M	Completed on 28.12.2010, public on the website 31.12.2010. MR ANNEX 5	PM
2nd round scenarios of the upcoming PP needs compiled and reported 2nd round of control threshold reported	31.3.2011	M	Completed 1.3.2011. MR ANNEX 6	PE, PSP
2nd round of test and demonstrations reported and 2nd round of back-casting reported	31.12.2011	M	Completed on 22.12.2011. PR ANNEX 4	PM
Final round scenarios of the upcoming PP needs compiled and reported and final round of control threshold reported	31.3.2012	M	Completed on 29.3.2012 PR ANNEX 5	PE, PSP
Report on process description and success of farm IPM demonstrations	30.9.2012	D	Deadline extension to 31.12.2012 asked in MR Completed and published online 31.12.2012. PR ANNEX 16	PE, PM, PSP
Report on defined benefits and weaknesses of different IPM methods and their direct and indirect dependency on climate change, land use and technological changes and direct and indirect influences on environmental risk	31.12.2012	D	Completed and published online 31.12.2012. PR ANNEX 17	PE, PM, PS
Final round of test and demonstrations reported	31.12.2012	M	Completed and published online 31.12.2012. PR ANNEX 6	PM
Report on the process of rotational improvement pest scenarios, monitoring systems and control thresholds	31.3.2013	D	Completed and published online 28.3.2013. FR ANNEX 5	PE, PM, PS
Strategy on disease resistance management in IPM published	30.6.2013	D	Completed and published online 28.6.2013. MTT Report 109. FR ANNEX 6	PSP, PE
Material and tools for building the IPM regulations and for training processes to be offered to professional users, distributors and advisors, www material.	30.9.2013	D	Materials as www.material published in project's website 30.9.2013	PE, PM, PS

IPM policy reports published. Policy review on the sustainable use of pesticides – updated. This report is described in connection with the Action 2, FR page 27.	30.9.2013	M	Update was made with the co-operation with Tukes, Evira and The Ministry of Agriculture and Forestry Finland. An updated report completed and published online 30.9.2013 in MTT's Report series MTT Raportti 20. FR ANNEX 2	PE, PS, PM
A synthesis report on implementation of IPM and aquatic risk assessment on Nordic-Baltic scale Please note that this report is also mentioned as a milestone of action 4. Report is described in connection with the Action 4, FR, page 32.	30.11.2013	D	Work started at mid-term seminar in Sweden on 14.6.2011 and report is made mainly in Action 4. The report was completed and published online in project's website 29.11.2013. FR ANNEX 11	LCA SP, PS

In charge/done by: PM=Project Manager, PE=Project Expert, PSP=Project Specialist, PS=Project Staff.
Category: M=milestone, D=deliverable product

Realisation of the tasks of Action 2

1. Scenarios for pest threatened crop systems have been evaluated and researched annually, in total three times, from the beginning of the project by the weed, insect and plant disease specialists nominated into the project. The scenarios and control thresholds have been updated according to the results of previous years. The results of each year's demonstrations were reported at farm, year and research area level until the end of each year and discussed in the yearly meetings at each local area in following January-February.

The main thread of the arable farming in relation to pesticide use is monoculture and one-sided cereal cultivation; especially in the changing climate. Diverse crop rotation is most important for controlling cereal diseases, which have become more common in last decades¹. Most of the cereal fungal diseases are soil borne or they can overwinter in the straw. Good pre-crops for cereals are peas and oilseed crops, which both reduce the amount of leaf-spot diseases (e.g. *Stagonospora nodorum* and *Drechslera tritici-repentis*). But the pre-crop effect is good only if the crop rotation is good (e.g. wheat every fourth year is better than in every second year)² Diverse crop rotation in combination with low-till practices may also impact the beneficial microbes in the soil, which then suppress the pathogenic fungi³. Monoculture, then, increases the populations of species specific, stationary insect pests, e.g. wheat midges (*Sitodiplosis mosellana*) and the Hessian fly (*Mayetiola destructor*). For more mobile species, an area-wide pest management strategy might be needed: high regional crop diversity and crop rotation of 4–5 years are sufficient to prevent the exponential growth of the pest populations, otherwise the pests move from a field to another and in that case, field-specific crop rotation is not enough⁴. For weeds, the success of annual herbicide use determines the weed densities in the coming years more, than crop rotation or monoculture. Weed management might be even more difficult in diverse crop rotation, while the amount of available control strategies might be restricted (e.g. few herbicides for oilseed crops), and failure in one year increases the seed bank and results in high weed density in the coming year. No-till cultivation affects also weed populations by favouring⁵.

For consumer's point of view, the amount of pesticides used is not the only problem. Some fungal diseases (*Fusarium* and *Aspergillus* species) are producing mycotoxins (e.g. DON

deoxynivalenol, zearalenon, fumonisins, HT-2 and T-2 toxins; aflatoxin) but the amount of toxins is followed by authorities, and acceptable daily intake levels have been set or are under progress at the EU level⁶. The main actions against seedborne *Fusarium*-species are crop rotation, seed dressing and certificated seed. Recently, the active use of some herbicides has been connected to the increasing amount of plant diseases, also *Fusarium* species⁷.

2. Pest monitoring and control thresholds reviewed annually.

All three rotations for pest scenarios and control thresholds are completed. Reviewed threshold values were sent to farmers and relevant stakeholders in years 2010-2012, and displayed on the website (IR ANNEX 4, MR ANNEX 5, PR ANNEX 5). A summary consisted of a review of the most important pests causing injury on cereals, the control threshold values used or existed for pests and the essential control methods and schedules. Field demonstration guidelines and observations were applied in the field demonstrations at 9 collaboration farms. The aim of the demonstrations was mainly to demonstrate the need of chemical control of different pests in cereals. The year 2012 was the final demonstration year.

3. Demonstration of novel testing methods

a) Farming system

Pesticide resistance mapping has been conducted as Nordic-Baltic cooperation. From several fields, including PesticideLife demonstration fields, the diseased leaf samples have been sent to analyze the resistance of fungal diseases against fungicides. Rothamstead petri-dish test for herbicide resistance cross testing has been tested in Nordic-Baltic research cooperation (5 research organisations) in last 5 years⁸, also in 2011. The results⁹ were published at the 4th NORBARAG meeting in Malmö, Sweden on 13.–14.12.2011. The main actors in the pesticide resistance mapping are pesticide manufacturers (BASF, Syngenta) and Danish Institute of Agricultural Sciences (DIAS). Please see also the crop rotation in Action 2, Task 1. The report of strategy on disease resistance management in IPM was published in MTT Raportti series as a publication no 109 on 30th of June 2013 (FR ANNEX 6).

b) Plant breeding

Resistance of varieties against leaf spot diseases was tested by artificial inoculation tests in the Finnish official variety trials and also the natural occurrence of the diseases were followed in the official variety trials. NSL and MTT also tested the new spring barley, wheat and oat varieties with and without fungicide applications at three different locations. As a partner of 'Public Private Partnership for resistance breeding' project, MTT studied the resistance of 180 Nordic modern cultivars and breeding lines against barley leaf spot diseases. The methods for *Fusarium* resistance breeding were developed^{10,11,12}.

c) Agricultural technique, mechanical and chemical weed control:

Crop diversification is a key element of IPM. As the project farmer Kari Vaismaa expressed in the mid-term seminar, we can't speak about IPM without diverse crop rotation. The agricultural policy tools should enable and encourage farmers to diversify their crop rotation. The new proposal for CAP proposes crop diversification, demanding at least three different crops per farm (when farm size is more than 30 hectare). Two demonstration fields of MTT at Jokioisten Kartanot are long-term and large-scale research fields on a) conventional tillage (ploughing) versus no-tillage and b) no-tillage with buffer zones. Both fields have been treated with glyphosate, and water samples of the subsurface drainage water have been collected twice per snow melting period in 2010 and in 2011 to assess the amount of

glyphosate and AMPA run-off to water bodies. These samples were analysed in autumn 2013 and some results were reported in connection with Action 4 task 3 report (FR ANNEX 11).

The chemical weed control demonstrations have been conducted on different tillage methods. The main finding is so far, that grass-type weeds become more common in no-tillage fields, and thus farmers need to pay attention to control of grassy weeds. Disease management by crop rotation and/or with fungicides is also important in low-tillage systems, where survival of pathogen spores is higher compared to ploughing¹³.

Mechanical weed control is in practice almost merely on organic farms in Finland. First steps towards mechanical weed management in PesticideLife have been initiated in the midterm seminar, where an advisor for organic farmers at ProAgria Uusimaa was supposed to give a talk on pest management practices without pesticides. A short summary of the talk was delivered to the seminar audience.

Field scale application of biochar is a novel technology to minimise risks of glyphosate leaching from fields to water systems. Glyphosate is the most commonly used pesticide in Finland forming more than 50% of pesticides sold yearly, and it is an organic phosphate in nature. It has been proved to sorb in soil organic matter¹⁴. Biochar is an organic compound and a novel form of using biochar, having potential to sorb fluorinated herbicides¹⁵. Because of its organic nature, it has been considered to bind glyphosate as well and further, to prevent glyphosate leaching. The glyphosate sorption capacity of biochar was tested in greenhouse demonstrations and it seemed to have a positive impact on sorption of glyphosate. The biochar increases the organic matter of soils, which might have also an impact on beneficial microbes in soil. Biochar has also potential in the novel farming system demonstrations, while adding soil organic matter influences the suppressive capacity of soils as do crop diversification and minimum tillage, too.

Different IPM methods were reviewed in the report defined benefits and weaknesses of different IPM methods (PR ANNEX 17). The need to develop non-chemical control was widely discussed in the IPM seminar in Tallinn.

Novel cereal leaf spot disease forecasting model was tested in practice in every demonstration farm of PesticideLife in the growing seasons 2010-2012, on 27 cereal fields in total. Model has been tested also on 8 agricultural school farms (collaboration farms). Modelled diseases are *Stagonospora nodorum* blotch (wheat), tan spot (*Pyrenophora tritici-repentis*, wheat) and barley net blotch (*Pyrenophora teres*). These fungal plant pathogens are present in 98%, 94% and 86% of the Finnish spring cereal fields respectively. **Virhe. Kirjanmerkkiä ei ole määritetty.**, but the environmental conditions may not favor the spread of the diseases. The model takes account of the pre-crop effect, tillage operations, disease resistance of the cultivar and local weather conditions, which all influence the spread of the diseases. Cereal diseases cause significant yield losses, and fungicide treatments increase the yield slightly over 10 %¹. The disease forecasting model is needed to estimate the occurrence of diseases and the timing of the fungicide treatment. To get a farm and field specific forecast, the model uses real-time weather data, which is either measured by wireless in-situ weather sensors developed by A-lab Oy (www.a-lab.fi) or interpolated as a dataset in a 10x10km grid by the Finnish Meteorological Institute. The model's ability to forecast the probability of the risk of plant diseases existing on barley and wheat was followed by plant sampling every 10th day during the growing season. The model alerts the farmer by a text message three times per growing season; when the disease risk is moderate, high or very high

(Figure 3). The farmer should spray with the fungicide latest after the second alert. The development of the disease forecasting model is a joint project of MTT, NSL, ProAgria advisory services and A-Lab. PesticideLife project farms formed a test-bed for the model. Forecasting model was forwarded in a commercial application WisuEnnuste in 2012 and is now available for all farmers and advisors. WisuEnnuste is a part Wisu- cropping planning software owned by ProAgria and it is subject to a charge. Before season 2012, the model was finalized based on the results of the previous seasons and the epidemiological studies made in growth chambers. The model works rather well and can be used to predict the cereal leaf spot disease risk. In 2013, when the primary demonstrations of Pesticidelife were over, seven demonstration fields in NSL and Southern Ostrobothnia regions were involved in the WisuEnnuste disease forecast testing. Four of the fields were sown with spring barley and three with spring wheat. From each field, 30 plants were collected and analyzed five times during the season. Due to the different weather conditions in 2013 than the previous years (higher temperature sum and lower precipitation), the demonstrations gave very valuable information for the WisuEnnuste disease forecast calibration. In addition to plant disease forecasting model, bird cherry aphid risk was also forecasted and information disseminated in MTT Kasper service.

d) Biological and nature based plant protection methods.

Biological control methods for cereals are not available yet and in open-field cultivation they are challenging to use.

e) In the chemical control demonstrations we have concentrated on measuring the situations when chemical control is needed and what are the economical benefits or losses of different applications. Most important non-chemical control methods were crop rotation and plowing from tilling methods. More long-term research or demonstrations are needed, because effects of crop rotation cannot be seen in the three years demonstrations. Demonstrations were a good base for developing IPM methods in practice, and cooperation with farmers, research and advisory services will be continued.

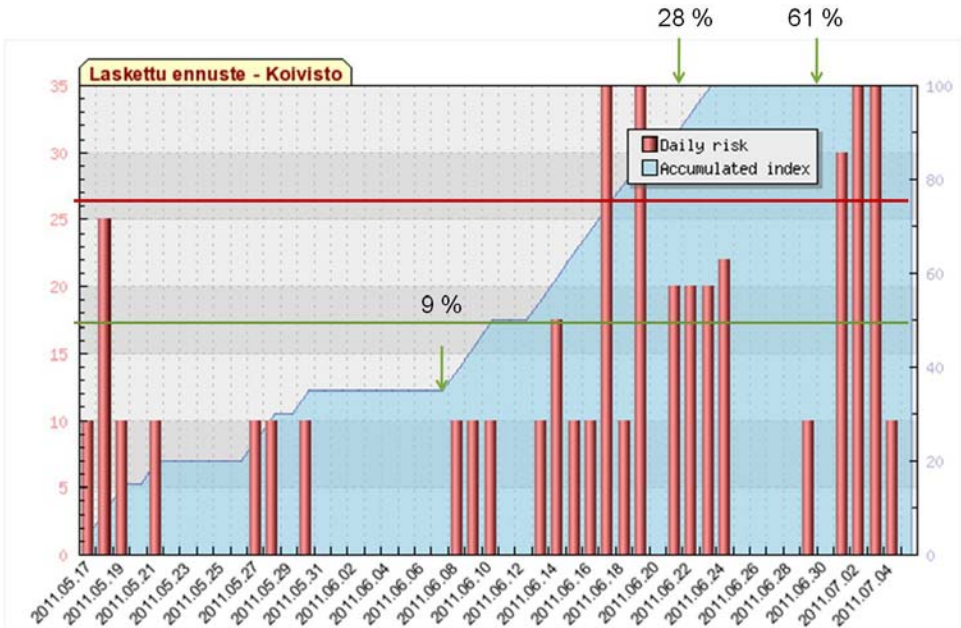


Figure 3. An example of the cereal leaf spot forecasting model, which calculates the daily and accumulated risks based on the data of cropping history and daily, location-specific weather. Farmer

gets text message alerts, when accumulated risk exceeds 50%, 75% and 100% (y-axis on right). The model was verified by plant sampling, which indicates 9%, 28% and 61% infection.

4. Backcasting of the development procedure

The yearly summaries were made for each farmer and in addition over all demonstration fields in each three locations, and finally as a summary of all fields per year. Results were discussed with the demonstration farmers in January or February in the three locations. The comparisons have been made also regionally, and the farmers and project field workers have been adopting best practices. Farmers have learned to avoid especially unnecessary pesticide sprays. However, control thresholds were not always followed, even though they would have been exceeded. The results of the demonstrations have been delivered to the NAP working group.

5. Report of the proposed IPM developing processes for NAP

Project expert Pauliina Laitinen (2010-2011) continued her career at Tukes as the Finnish coordinator for NAP, and thus the PesticideLife's best practices have been very closely related to the NAP work in Finland and more widely, in the Nordic-Baltic area. Many results of the PesticideLife project and NAPs of several countries were thoroughly discussed in the NJF IPM seminar in Tallinn in November 2012.

6. Main outputs of action 2

Two deliverable reports were published in Finnish on 31st of December 2012 as net publications to help farmers and advisors in the IPM implementing (PR ANNEX 16 and 17). Because the target groups of these reports were Finnish farmers, we asked and got permission to publish these reports in Finnish (e-mail from Mr Nogara, 24.10.2012.). Reports were written in popular form instead of scientific. Reports were published online on the project's website.

The report about **Process description and success of farm IPM demonstrations** was mentioned in the project plan in Action 1 but in the table of deliverable products (page 15 part C) it is a deliverable product for Action 2. In original project plan this report was planned to be published 30.9.2012. The planned deadline seemed to be too early for proper observation of the success of IPM demonstrations including year 2012. In MR we asked and got permission (feedback of MR, 2.5.2012) to postpone the completion of this report from 30.9.2012 to 31.12.2012. By this adjustment, we were able to make more informative report including also preliminary results of the farm demonstrations. In this report we wrote in practice the "materials and methods" of the field demonstrations and their qualitative results (PR ANNEX 16). Demonstrations, monitoring methods and control thresholds were presented. The success of demonstrations was analyzed by farmers, technical staff and project specialists. The actual results were published in March 2013 (FR ANNEX 5).

Most important IPM methods were evaluated based on the future changes in land use, technology development and climate change. **Report on defined benefits and weaknesses of different IPM methods** and their direct and indirect dependency on climate change, land use and technological changes and direct and indirect influences on environmental risk was completed and published according the project plan on 31st of December 2012 (PR ANNEX 17).

Report on the process of rotational improvement pest scenarios, monitoring systems and control thresholds was completed and published 28.3.2013. The report includes the results and discussion about the farm demonstrations. Report was published online on the projects website and delivered to the demonstration farmers (FR ANNEX 5).

The report of strategy on disease resistance management in IPM was published in English in June 2013. The report was published online in MTT's Report series to reach more readers both in Finland and in international level. Online publication in MTT's series, Report 109, did not cause any extra costs. The link to the report was added to projects website. The publication is named "The management of fungicide resistance in cereals in Finland" (FR ANNEX 6).

The policy review of sustainable use of pesticides was updated and re-published in MTT's Report series as a publication no 20 in September 2013. The policy review is described more detailed in connection with Action 1, FR page 16 (FR ANNEX 2).

Materials and tools for building the IPM regulations and for training processes for professional users, distributors and advisors was published as a www-material in project's website in September 2013. The materials include both basic information of the principles of IPM and information of pest-specific prevention, monitoring and control methods. The material is offered for farmers and stakeholder groups in Finland and the language of the material is Finnish. <https://portal.mtt.fi/portal/page/portal/mtt/hankkeet/pesticidelife/ipm-ohjeita>

A synthesis report on implementation of IPM and aquatic risk assessment on Nordic-Baltic scale was prepared and published in English in November 2013 with the co-operation of task 4. The Report was published online in project website. The language of the report is English. The report is described more detailed in section of action 4. (FR page 32, ANNEX 11)

Additional reports and outputs:

In addition to the mentioned deliverables in project plan, in summer 2013 PesticideLife published three A4-size posters of pesticide resistance management of fungicides, herbicides and insecticides. These posters summarize the basic information about the pesticide resistance and its restriction methods in the Finnish marked situation in 2013. Posters are based to the material launched in the NORBARAG meeting in January 2013. The target group of these publications was Finnish farmers and therefore the language of the posters is Finnish. The restriction of pesticide resistance is a very topical issue in Finland, and therefore we wanted to spread the information by publishing these posters although they were not mentioned in project's plan. This information was deeply required by farmers. We took a print of 2000 copies of each poster and these copies were delivered in several agricultural exhibitions, seminars and meetings. Posters can also be printed from the project's website. The costs for printing these posters were 1223,52 EUR (including VAT). (FR ANNEX 7a, 7b, 7c)

In summer 2013 project published also two additional reports in MTT's Report series. These two reports are based on PesticideLife's three reports published in projects website 31.12.2012 and 28.3.2013. The first report is an updated and edited version of the report "Defined benefits and weaknesses of different IPM methods" (MTT's Report no 107, FR ANNEX 8) and the other report summarizes the material and methods and results and conclusion of the project demonstrations (MTT's Report no 108, FR ANNEX 9). Both reports

were published in paper (200 copies) and electronic format and the target group for both reports was Finnish farmers and stakeholder groups. These reports were not mentioned in project plan, but we wanted to publish the most critical results in the MTT's official publication series in order to catch wider audience and more publicity. The paper versions of both reports were delivered to the audience in Closing Seminar. The printing costs of these additional reports were 4836,00 EUR (including VAT).

As a part of development work of new IPM tools, PesticideLife participated in development work of IPM portal. This project and PesticideLife's contribution to it is described in connection with Action 1, task 4, FR page 18.

PesticideLife has also participated together with other IPM projects of MTT in IPM matrix-work. The matrix work started in IPM seminar in Jyväskylä on November 2012. The aim of this matrix-workgroup is to collect all knowledge and show knowledge gaps considering the IPM methods in plant production and focus the research needed for the further development of IPM. The specialists of PesticideLife have focused in questions considering the IPM of cereal plants. This workgroup has had 5 official meetings during the year 2013 and several meetings in smaller groups focusing in crop specific cases. The work will continue in 2014.

Literature:

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<http://www.mtt.fi/afs/pdf/mtt-afs-v20n1p62.pdf>.

² Jalli, M. 2009: Viljelykierrossa vuosi ei riitä. In: Heikki Jalli, ed. *Kasvinsuojelupäivä*. Jokioinen 20.1.2009. Kasvinsuojeluseura ry. p. 23. (abstract of a seminar presentation, in Finnish).

³ Palojärvi, A., Jalli, M. 2009. No-till and crop rotation soil microbes potentially suppressing pathogenic fungi. In 5th IOBC Working group meeting on multitrophic interactions in soil. June 11-13, 2009. Uppsala, Sweden. Book of abstracts.

⁴ Huusela-Veistola, E., and Jauhiainen, L. 2006: Expansion of pea cropping increases the risk of pea moth (*Cydia nigricana*; Lep., Tortricidae) infestation. - *Journal of Applied Entomology*, 130, 142-149.

⁵ Jalli, H. 2006: No-till cultivation suppresses broad-leaved weeds but favours grasses. NJF Seminar 378, NJF Report 2(4):20. [http://www.njf.nu/filebank/files/20060616\\$231358\\$fil\\$407Ns2Pn0OE5w6N20UU0.pdf](http://www.njf.nu/filebank/files/20060616$231358$fil$407Ns2Pn0OE5w6N20UU0.pdf) (abstract).

⁶ Hallikainen, A. (ed) 2010: *Elintarvikkeiden ja talousveden kemialliset vaarat*. - Evira publications 15/2010, 148 pp. (In Finnish).

⁷ Johal, G.S. and Huber, D.M. 2009: Glyphosate effects on diseases of plants. - *European Journal of Agronomy*. 31:144-152.

⁸ Laine, P. and Jalli, M. 2011: Viljoja voittavien kasvitautien fungisidiresistenssi Pohjoismaiden ja Baltian alueella. *Kasvinsuojelulehti* 1:8-11. (in Finnish)

⁹ NORBARAG 2011: Database on fungicide resistance cases www.mtt.fi/norbarag.

¹⁰ Kangas, A., Jalli, M., Kedonperä, A., Laine, A., Niskanen, M., Salo, Y., Vuorinen, M., Jauhiainen, L and Nikander, H. 2010: Viljalajikkeiden herkkyyks tautitartunnoille virallisissa lajikekokeissa 2003-2010. - *MTT Kasvu* 11. 38 pp. <http://www.mtt.fi/mttkasvu/pdf/mttkasvu11.pdf> (in Finnish)

¹¹ NordGen 2011: Project 'Public Private Partnership on pre-breeding'.

<http://www.nordgen.org/index.php/fin/content/view/full/1907>

¹² NordForsk Network 2011: Project 'Sustainable primary production in a changing climate',

<http://www.risoe.dtu.dk/nordforsk.aspx>

¹³ Jalli, M., Erlund, P., Peltonen, S., Hannula, A., Seppä, E. and Thessler, S. 2011: Ennusteet auttavat näkemään pidemmälle. Seminar presentation at the PesticideLife mid-term seminar and Syyspuinti seminar on 1.11.2011.

¹⁴ Albers, C.N., Banta, G.T., Hansen, P.E. and Jacobsen, O.S. 2009: The influence of organic matter on sorption and fate of glyphosate in soil - Comparing different soils and humic substances. - *Environmental Pollution*, 157:2865-2870. Open access: <http://www.sciencedirect.com/science/article/pii/S0269749109001973>.

¹⁵ Sun, K., Keilueit, M., Kleber, M., Pan Z., and Xing, B. 2011: Sorption of fluorinated herbicides to plant biomass-derived biochars as a function of molecular structure. - *Bioresource Technology*, 102: 9897-9903. Open access: <http://www.sciencedirect.com/science/article/pii/S0960852411011242>.

5.1.3 Action 3 (deleted)

This action has been deleted from the final proposal.

5.1.4 Action 4 Vertical and horizontal and Nordic-Baltic implementation of the IPM actions (COMPLY)

Table 3. Deliverables and milestones of Action 4

Name of the Deliverable or Milestone	Deadline	Category	Status	In charge/done by
<p><u>Two reports in the tasks 1 and 2 was combined into one (a permission was asked for and obtained from EU in 24.10.2012):</u></p> <p>The original names of the two combined reports according to the project plan were: a) A synthesis report on definition of the role of pesticide issues in vertical food chains, assessing pesticide eco-toxicological impact in LCA, facts to be taken into account in policy development. b) A synthesis report on definition of the role of pesticides in horizontal (watershed) approach, assessing eco-toxicology in horizontal scale, facts to be taken into account in policy development.</p> <p>→ <u>Report of tasks 1 and 2:</u></p> <p>How to measure the environmental risks from uses of plant protection products for achieving the IPM requirements and risk communication – A case study on the production chain of cereal farming in Finland</p>	30.6.2013	D/ M	Started in March 2012, completed and the report published both online and in paper in MTT's Report series 28.6.2013. FR ANNEX 10	PSP, PM
<p><u>Report of task 3:</u></p> <p>A synthesis report on implementation of IPM and demonstrating the aquatic risks of plant protection products on a Nordic-Baltic scale</p>	30.11.2013	M	Work started at mid-term seminar in Sweden 14.6.2011. Report completed and published online in project's website 29.11.2013 FR ANNEX 11	PSP, PM

In charge/done by: PM=Project Manager, PE=Project Expert, PSP=Project Specialist, PS=Project Staff, EA=External Assistance. Category: M=milestone, D=deliverable product

Realisation of the tasks of Action 4

Tasks 1-2 of the action 4:

Task 1) A synthesis report on definition of the role of pesticide issues in vertical food chains, assessing pesticide ecotoxicological impact in LCA, facts to be taken into account in policy development.

Task 2) A synthesis report on definition of the role of pesticides in horizontal (watershed) approach, assessing ecotoxicology in horizontal scale, facts to be taken into account in policy development.

In October 2012 we asked approval to combine the reports of tasks 1 and 2 into one, and 24.10.2012 we got the acceptance (e-mail from Mr. F. Nogara) to actualize it. However, we were asked to take care that the content of the reports to be combined will not be reduced. The aim of tasks 1 and 2 was to demonstrate the studies of environmental effects of plant protection products (PPP) into two views: vertically (task 1) to define the role of pesticides in vertical food chains, assessing of pesticide ecotoxicological impact in LCA (vertical view), and horizontally (task 2) to define the role of pesticides in a horizontal (watershed) approach, assessing ecotoxicology in horizontal scale (horizontal view). In addition, the aim was linked with the EU strategy on the sustainable use of pesticides, where attempts are made to reduce the health and environmental risks via integrated pest management (IPM). Indicators are also needed for the measurement of the risk reduction actions. At this moment, in many EU countries, only PPP use volumes and/or sales data are used as indicators of the risks. Thus, for achieving the aims, in this study a demonstration procedure was developed for the measurement of risk reduction actions via IPM.

This demonstration procedure is a combination of two methods. In it the effects of actual field usage of plant protection products, data obtained from one case study via TIKE, are calculated with these two methods leading to two dimensions. The effects on the food chain are studied with ecotoxicity impact of life cycle analysis (LCA) in the vertical dimension. The effects on the landscape environment are studied with HAIR risk indicators, available in the EU, in the horizontal dimension. IPM implementation influences two dimensions, thus both dimensions were used for obtaining a larger or more realistic picture of the environmental actions. So, two different risk values from two dimensions are obtained as a result of this procedure. In the future, the results obtained from different time periods will describe the progress of the risk and thus IPM development. This procedure can be applied and used in risk communication purposes with different stakeholder groups. The procedure is shown in Figure 4.

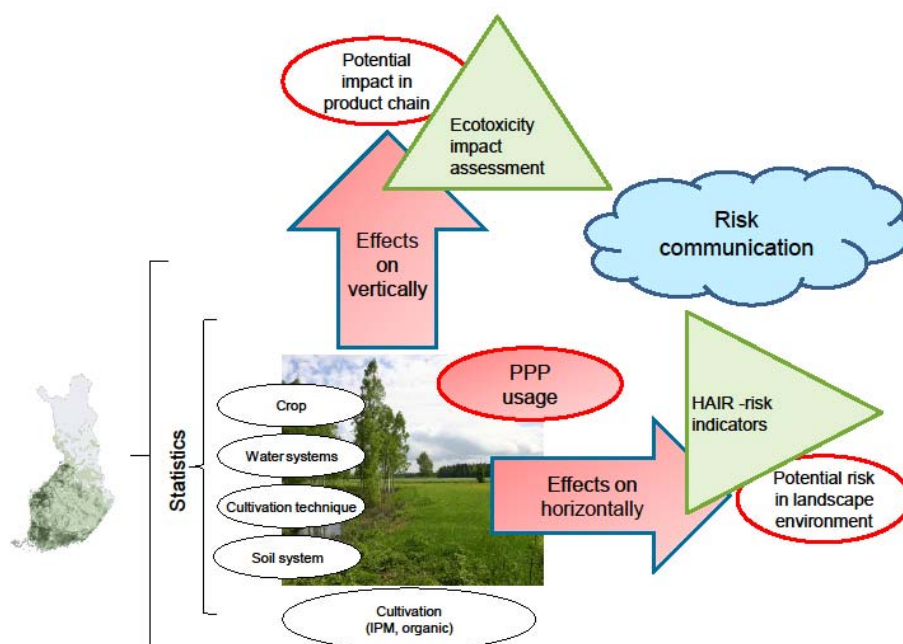


Figure 4. A proposed procedure to study the progress of IPM in vertical and horizontal dimensions.

The published report is available online and the printed version was shared to the main experts in this field in Finland but also in EU (FR ANNEX 10). In addition, the procedure was served for Finnish authorities to use it to measure IPM development in the future. At this moment, no funding is available, so the procedure is not yet in usage.

During the study cooperating was done with developers of HAIR risk indicators (Roel Kruijne in the Netherlands). Experiences and help were asked for them by email. In addition, in December 2013 the developers asked us if our published results and the way to use HAIR software could be used in their new manual. Thus, the permission was asked for Finnish authority TIKE who owns the original PPP usage data. The permission was obtained and data concerning Finnish ELY region calculations was served for HAIR developers. Our way to do this work was new in the HAIR software and thus important for the developers. So, PesticideLife could be a part of new HAIR manual (under progress) available at the near future.

Task 3:

A synthesis report on implementation of IPM and demonstrating the aquatic risks of plant protection products on a Nordic-Baltic scale

The aim of this task was to collaborate and implement integrated pest management (IPM) practices in cereals and discuss the methods for measuring risks on aquatic systems on the Nordic-Baltic scale. Collaboration and implementation were performed in order to find suitable experts for the network. This was a way to build up steady collaboration for knowledge exchange, and initiate new activities under the auspices of available institutions. In addition, different events were organised and participated in, and information was shared.

The method to measure risks on aquatic system was used with the procedure developed in the tasks 1-2 and reported on 30 June 2013. The procedure of using HAIR2010 and Usetox tools was used for demonstrating the aquatic risks induced by PPPs. This procedure can be used to measure IPM development by national authorities in the future. The usage data, originally collected for administrative purposes, was provided. The usage of both models (HAIR and Usetox) was a new process for the project experts, and they had to start from the beginning. At least Usetox will be used as a useful permanent tool in the following MTT projects.

In addition to this procedure, some chemical analyses from the demonstration fields in Jokioinen were done. In autumn 2013 researcher Sari Rämö was seconded to the project for one month period to analyze glyphosate and AMPA residues from the water samples taken from PesticideLife's demonstration fields. The procedure is described in more details in report of task 3 (FR ANNEX 11). In addition, we also collaborated with another research project, called GlyFos (Environmental risks of glyphosate use: transport in clay soils and leaching to watercourses, 2010-2014), coordinated by MTT and funded by the Ministry of Agriculture and Forestry. The detailed results about this study will be published in our common scientific article being in progress (Uusi-Kämpä et al.).

Knowledge of different experts working in different areas was successfully combined in this project. Results were shared and communicated with the other researchers, experts, farmers and the public. The experts had willingness and competence to cross borderlines of teams and projects. These experiences will be shared in the collaboration between the Nordic-Baltic countries and even in larger scale. Collaboration and further research is urgently required in the future.

Indicators of progress

Completeness of the networks (%), activity of the networks (number of meetings), and completeness of the preparations for synthesis reports (%) were indicators for the COMPLY 4, shown in table 4.

Table 4. Indicators for the COMPLY 4.

Publication*	How many
Scientific and professional articles and reports	12
Abstracts, poster and oral presentations in scientific meetings	8
Abstracts, poster and oral presentations in public meetings	14
Participation in training and clustering events	3
Total	37
Network**	Who
Nationally in Finland	
	Inside MTT
	TUKES
	TIKE
	SYKE
	PPP companies and other experts
	Farmers
Internationally	
	NJF
	HAIR risk indicator developers
	EFSA
	Other experts

*More details in report of task 3.

**More details in section of 5.1.1.

The points of view on human health:

In the feedback (25.7.2011) concerning the visit of the desk officers we were asked to refer some studies and research which elaborate the pesticide issue and risks directly from the human point of view. The action 4 was conducted to study aquatic risks induced by pesticides. The same models (HAIR risk indicators and Usetox) can be also used to study the effects on humans (Kruijne et al. 2011; **USEtox**TM 2013).

With HAIR risk indicators the acute and chronic effects on humans exposed by pesticides can be studied. With the Usetox the results describe the potential carcinogenic damage on humans. Humans can be exposed on pesticides via inhalation and ingestion, pesticides are released from a treated area to the environmental compartments (air, soil, water). The effects are the changes in life time disease probability due to the change in life time intake of a pollutant (cases/kg). Some studies have been done to study pesticide effects on humans with Usetox. They concluded that when people eat different food they are exposed to different pesticides that have different effects on human health (Fantke et al. 2012; **Fantke et al. 2011**).

These tools, HAIR and Usetox, give an opportunity to compare effects of different pesticides on different times.

Literature

Kruijne R., Deneer J., Lahr J. and Vlaming J., 2011. HAIR2010 Documentation. Calculating risk indicators related to agricultural use of pesticides within the European Union. Alterra Report 2113.1. Alterra, Wageningen UR. Available at <http://www.hair.pesticidemodels.eu/documentation/HAIR2010%20Documentation.pdf>. Access in 24th in June 2013.

Fantke P., Friedrich R. and Jolliet O. 2012. Health impact and damage cost assessment of pesticides in Europe. *Env Int* 49: 9-17.

Fantke P, Juraske R, Antón A, Friedrich R and Jolliet O. 2011. Dynamic multicrop model to characterize impacts of pesticides in food. *Env Sc Tech.* 45(20): 8842-8849.

USEtox™, 2013. USEtox™ UNEP/SETAC model for the comparative assessment of chemicals released to air, water and soil and their toxic effects on the human population and ecosystems, version 1.01, 15 February 2010, Available at <http://www.usetox.org>. Access in 24th in June 2013.

Please note: Action 5 DISSEMINATION is described in own section, pages 36-46. Action 6 MANAGEMENT is described in pages 11-14.

5.1.5 Action 7 Monitoring of the effectiveness (MONITORING)

The first monitoring report (IR ANNEX 10) was sent to the Project Manager on 29.4.2010 and discussed in the Management Board on June 11th 2010. A report of self-assessment of the viability of the project was completed on 31.8.2010 and presented to the Management Board on 1.12.2010 (MR ANNEX 14). The role and contribution of internal monitoring for project years 2011–2013 has been discussed carefully according to the first year's experience. Five reports in total have been presented to the Management Board by Internal Monitors Pasi Voutilainen (2010) and Pekka Manninen 2011-2013. The 1st annual report of the effectiveness of the project actions has been presented to the Management Board on 7.12.2011 (MR ANNEX 15). The 2nd report was signed on 14.12.2012 (PR ANNEX 13) and the 3rd report was signed on 17.12.2013 (FR ANNEX 12).

The internal monitoring reports are confidential, and they are not presented at the projects website. The Monitor evaluated that the PesticideLife project worked very well, and all beneficiaries were well experienced in project management and realization.

Project's Financial Secretary Taru Könkö (Mäki) was taking care of the financial part of the project. In MR we asked for approval to transfer the costs from ACTION 7 to other actions, in more detail: external assistance costs (ACTION 7 Monitoring) to ACTION 4: other costs +5 000 € and to ACTION 5: travel costs +10 000€ and other costs +5 000 €. At the project application time, the requirement of monitoring the effectiveness was not very clearly defined, and it was unclear, whether the monitoring work is acceptable as internal personnel cost or external assistance. The change claimed did not affect the targets, results or deliverables of the project.

According to the recommendations of Internal Monitor, risk assessment process of the PesticideLife project was implemented in 2012 and it was executed twice both in 2012 and 2013 (PR ANNEX 12, FR ANNEX 13). The conclusions of the risk assessment were presented to the Management Board. As a result, weekly team meetings were started in spring 2012.

5.2 Dissemination Actions

5.2.1 Objectives

Centralised dissemination process concentrated on preparing and managing and materially supporting the project information distribution. The objective was to identify the interest groups and their specific needs and interests and make the produced material easily available for each group. The one aim of the dissemination processes was to support other tasks in their publication and communication work e.g. graphic and visual images, editing processes and language checking. Publication and communication work, organising seminars and participating in different events were the main tasks of dissemination.

All deliverables and milestones of action 5 have been completed in schedule. The dissemination work has been wider than planned and especially attendance to the international events and work groups has been more active and wide than foreseen in project plan. The project team has taken special notice that all deliverables of the action 5 are bearing LIFE logo.

5.2.2 Dissemination: overview per activity

Table 5. Deliverables and milestones of dissemination, Action 5.

Name of the Deliverable, Milestone	Deadline	Category	Status and delivery to the Commission	In charge/done by
Project brochures, in Finnish, English and Swedish	31.1.2010	D	Completed 29.1.2010. IR ANNEX 6a, 6b, 6c.	PE, PM, PSP
A project website	28.2.2010	D	Completed; 28.1.2010 Finnish, 9.4.2010 English and 19.4.2010 Swedish (IR) www.mtt.fi/pesticidelife www.mtt.fi/pesticidelife/en www.mtt.fi/pesticidelife/se	PE
Technical publications on project: proceedings of the opening seminar	28.2.2010	D	Completed; 18.2.2010. FI, IR ANNEX 8a, 23.8.2010 EN IR ANNEX 8b	PE, PM
A website – opening seminar and proceedings	28.2.2010	M	Completed; website 28.1.2010 and seminar 18.-19.2.2010. Proceedings completed and published in Finnish 18.2.2010 and in English 23.8.2010	PE
First visitor guides for demonstration sites (26)	31.5.2010	D	Completed 27.5.2010. IR ANNEX 7.	PE
Notice boards – up to 120 items – first ones	31.5.2010	D	Completed 27.5.2010. IR ANNEX 5a, 5b, 5c.	PE, PS
Second visitor guides for demonstration sites (26)	31.5.2011	D	Completed 31.5.2011. MR ANNEX 7	PE, PS

Notice boards – up to 120 items – second ones	31.5.2011	D	Completed 31.5.2011. MR ANNEX 8a,b,c	PE, PS
Project brochures	30.11.2011	D	Completed: 24.10.2011 FI. MR ANNEX 9a, 8.11.2011 EN, SE MR ANNEX 9b,c; additional brochures. MR ANNEX 9d,e.	PE, PSP
Technical publications on project: proceedings of the mid-term seminar, Mid-term seminar and proceedings published	31.12.2011	D/M	Completed: International part: 14.6.2011 and National part 1.11.2011. Proceedings published at the seminar, and on the website 21.6.2011 MR ANNEX 10 and 2.11.2011 MR ANNEX 11a,b,c.	PE
Third visitor guides for demonstration sites – last ones	31.5.2012	D	Completed, 29.5.2012, delivered PR ANNEX 7	PE, PS
Notice boards – up to 120 items – last ones	31.5.2012	D	Completed, 29.5.2012, delivered PR ANNEX 8a-8c	PE, PS
Films: total 3 hours, minimum 2000 photos in a database	20.9.2013	D	We got permission (in PR feedback, 14.3.2013) to make a shorter, 30 to 60 minutes film and use external assistance to ensure the quality of the film. The film was divided in two parts and short summary. The films completed and published in web 20.9.2013. FR ANNEX 18 http://vimeo.com/74633846 http://vimeo.com/75228700 http://vimeo.com/77384985 We had over 2000 photos in a location specific web album by 20.9.2013. Example photos FR ANNEX 14	PS, PE, EA
A layman's report, A layman's report – published	30.11.2013	D/M	The multilingual Layman's report completed and published both in paper and in electronic form in projects website in 29.11.2013. Languages: Finnish, English and Swedish. Note: We got permission to reduce the amount of copies from 5000 to 600 (email from Giulia Garboni, 01.10.2013). FR ANNEX 15a, 15b, 15c	PE, PS, PM, EA
Articles for the press, total 36 articles completed	30.11.2013	D	35 articles completed, publications list (PR ANNEX 10a) Total 36 articles in printed media and total 105 published publications completed 29.11.2013. (FR ANNEX 16)	PS, PE, PM
Project brochures, last ones	30.11.2013	D	Completed and published in Finnish, English and Swedish 12.11.2013 (FR ANNEX 17a, 17b, 17c)	PE, PM, PSP
Technical publications on project: proceedings of the closing seminar, Closing seminar and proceedings published	31.12.2013	D/M	Proceedings of the international part of the closing seminar published on 7.11.2012 (PR ANNEX 9a) Proceedings of the national part of closing seminar published in Finnish 13.11.2013 and translated in English and Swedish by the end of the year 2013. (FR ANNEX 19a, 19b, 19c)	PE

In charge/done by: PM=Project Manager, PE=Project Expert, PSP=Project Specialist, PS=Project Staff, EA=External Assistance. Category: M=milestone, D=deliverable product

Realisation of the tasks of Action 5

1. Notice boards

Table 6. Amount of notice boards and visitor guides erected to demonstration fields and presented in events.

Year / Region	Nylands in Swedish	Jokioinen region	Southern Ostrobothnia	Notice boards as posters	In total	Delivery to the COM
2010	9	8	8	8	33	IR ANNEX 5 a, b, c
2011	8	9	9	15	41	MR ANNEX 8 a, b, c
2012	8	9	9	14	40	PR ANNEX 8 a, b, c
2013	-	-	-	7	15	FR ANNEX 20

Field-specific notice boards have been erected to the selected demonstration fields. Other notice boards have been presented as posters on field days and other events. About 30 notice boards were erected yearly, totally up to 120 notice boards by year 2013 (Table 6). 129 notice boards were achieved in 2013 when the project results have been presented in various events and seminars (FR ANNEX 20). All notice boards can be found from the project website.

2. Website

Table 7: Website visits per month and year in Finnish (FI), English (EN), Swedish (SE) websites, web-album and total amount of website visitors. Follow-up of Swedish and English websites started in September and August 2010.

FI	1	2	3	4	5	6	7	8	9	10	11	12
2010		1324	258	867	801	2578	738	1155	416	379	353	295
2011	348	210	239	525	567	1133	270	215	416	304	773	655
2012	665	230	952	529	820		205	69	46	67	101	52
2013	78	45	65	81	43	51	82	61	100	172	262	119
EN	1	2	3	4	5	6	7	8	9	10	11	12
2010								689	77	38	50	45
2011	22	12	32	43	58	295	18	15	37	25	22	101
2012	87	6	137	75	102	124	20	15	14	20	29	15
2013	4	10	9	10	20	24	19	21	21	31	52	40
SE	1	2	3	4	5	6	7	8	9	10	11	12
2010									19	27	6	7
2011	3	4	6	46	12	32	2	1	20	3	13	16
2012	19	3	76	41	20	112	17	1	1	0	0	0
2013	3	1	1	2	1	4	3	1	1	1	2	2
Web album	1	2	3	4	5	6	7	8	9	10	11	12
	1	2	3	4	5	6	7	8	9	10	11	12

2010								6	15	9	15	9
2011	15	8	13	14	32	32	19	37	19	24	23	23
2012	24	14	17	6	28	28	48	25	21	9	27	12
2013	17	15	12	14	14	13	30	22	51	22	35	16
Web visits in total per month	1	2	3	4	5	6	7	8	9	10	11	12
2010		1324	258	867	801	2578	738	1850	527	453	424	356
2011	388	234	290	628	669	1492	309	268	492	356	831	795
2012	795	253	1182	651	970	264	290	110	82	96	157	79
2013	102	71	87	107	78	92	134	105	173	226	351	177

The PesticideLife website provides information about the project, its objectives, actions, progress and results. The Finnish website was established already in January 2010 and English and Swedish websites were established in April 2010. The website has been updated regularly (weekly in summertime and monthly in winter period). Website visitors were followed up by *Google Analytics* monthly and site visits have reached the projects targets being up to 2500 per month (Table 6). Anyway, the monthly number of visitors varied greatly. The averages of web visitors per month in this 4 year period were 428 in Finnish site, 78 in English site and 14 visitors in Swedish site. The average of visitors in web album was 19 visitors per month. Because the Swedish website has had very low visitor rates, the regular updating has been devoted to the Finnish and English websites. The all products of the project are added or linked to the website, including e.g. educational IPM videos, all reports, notice boards, posters and brochures. In the English website there is a comprehensive list of all deliverables and milestones of each action named according to the project plan (revised application) and exact dates of their completion and publication. This list was made to make easier to follow the development of the project (reference to IR feedback, 24.9.2010).

The website offers a great baggage of IPM information, and this information has been actively marketed for the farmers, advisors and teachers in agricultural high schools. Project's Facebook page and Picasa web album have been updated regularly and new blog was started in summer 2012. Blog gained fast hundreds of readers and by the end of year 2013, the number of readers was over 1500. Among the other products produced by PesticideLife, the project's blog texts have been in use in educator trainings of plant protection trainings organized by the Finnish authority Tukes. The role of the PesticideLife website has been and will be very important in IPM implementation in national level. The project has not had a general e-mailing list, but we have collected the specified e-mail lists for example inviting different interest groups to the seminars. For example, over 100 people from different interest groups (e.g. farmers, advisors, authorities, company people, researchers, teachers, press) were invited to the final seminar by e-mail. FI: www.mtt.fi/pesticidelife, EN: www.mtt.fi/pesticidelife/en SV: www.mtt.fi/pesticidelife/se

3. A layman's report

Layman's report of eight pages was published according to the schedule in November 2013 in Finnish, English and Swedish (FR ANNEX 15a, 15b, 15c). We asked and got permission (e-mail from Giulia Garboni, 01.10.2013) to decrease the planned number of printed copies of Layman's report from 2000 + 2000 + 500 (FI + EN + SE) to 300 + 200 + 100 (FI + EN + SE). The reasons for such cutbacks were both ecological and financial. One reason for reducing the number of copies is that Layman's report is also available in electronic form in project's website. The English and Swedish versions were translated by the official translator in order to get fluent text for broad audience. The Layman's report has and will be distributed in various seminars and exhibitions. The report was also sent for the stakeholders, collaboration

farmers and other partners. The After-LIFE Communication Plan is published by the end of the project in Finnish and English (FR ANNEX FI 21a, EN 21b). The After-LIFE Communication Plan includes national and Nordic-Baltic communication (e.g. NJF IPM Working Group will continue its work).

4. Media work

Table 8. Media work. PI = Press Invitation, PM = Press Meeting, PC = Press Conference, PR = Press Release

PesticideLife seminars	Target group	Deadline	Completed	Participants	Press
Opening seminar	National	28.2.2010	18.-19.2.2010	27 and 59	PI, PC, PR,
Mid-term seminar	International	31.12.2011	14.6.2011	25	
Mid-term seminar	National	31.12.2011	1.11.2011	183	PI, PC
Final seminar	International	31.12.2013	7.-8.11.2012	80	
Final seminar	National	31.12.2013	13.11.2013	108	PI, PR
PesticideLife Field Days	Target group	Deadline	Completed	Participants	Press
Jokioinen region	Farmers	Growing season 2010	6.7.2010	36	PR
Nylands	Farmers	Growing season 2010	22.6.2010	23	PI
Southern Ostrobothnia	Farmers	Growing season 2010	3.8.2010	39	PI
Jokioinen region	Farmers	Growing season 2011	19.7.2011	150	PI, PR
Nylands	Farmers	Growing season 2011	7.7.2011	1300	PR, PC
Southern Ostrobothnia	Farmers	Growing season 2011	27.7.2011	33	PI
Jokioinen region	Farmers	Growing season 2012	17.7.2012	38	PR, PI
Southern Ostrobothnia	Farmers	Growing season 2012	18.7.2012	42	PR, PI
Nylands	Farmers	Growing season 2012	11.7.2012	15	

To reach the target audience and wider publicity to the seminars and field days, these events were advertised in local- and national newspaper media. The field days were advertised in local newspapers of each area and total amount of these advertisements was 7. The national opening-, mid-term-, and closing seminars were advertised in national agricultural newspaper, Maaseudun tulevaisuus, to reach wider audience. Maaseudun Tulevaisuus has 2nd largest readership among Finnish newspapers and it is especially popular among the farmers and land owners, reaching over 300 000 readers daily. The total costs of newspaper advertisements were 3764,92 €(ANNEX 22 Newspaper advertisements). All events were also advertised for free in PesticideLife's home page and in other popular agricultural www-portals like Agronet, Farmit-net and KSS's WebPages.

In 2010: The project organised two field days and attended to one at Nylands. The press was invited to all organised events, and a press meeting/conference was organised, including the opening seminar (Table 8). The first field day at Marja and Heikki Jalli's farm in Koski Tl on 6.7.2010 was very successful. There were 36 participants, of which 6 were from the press, 2 from main TV-producer YLE, 22 farmers and/or agricultural advisors and 6 were project staff. In the same evening, the project was on the national TV-news, South-West regional TV-

news, and on the news of Turku region at Radio Vega (Swedish-speaking) in the next morning. Field day at Nylands region was organised by NSL at Västankvarn farm on 22.6.2010, with 23 visitors of which 19 were farmers. Project's presentation was part of the program. NSL organised also a research day at Stor Sarvlaks farm in Loviisa on 7.7.2010, presenting the project, 40 visitors of which 35 were farmers. The Ostrobothnian field day at Kari Vaismaa's farm was held on 3.8.2010. There were 39 participants, of which 2 were from the press, 29 farmers and 8 project staff. The field days resulted several press hits in total (MR ANNEX 12b).

The project has been as a part of MTT's stand (with no participation fees) at Agri-cruise on 11.-12.2.2010, organised by Hankkija-Maatalous Oy with about 1500 participants; Vilja2010 at Yara Kotkaniemi on 17.6.2010, organised by agricultural companies Yara Finland, Agrimarket, K-Maatalous and Y-Maatalous, 1500 visitors; and "Productive Fields Day" Pelto Tuottamaan Päivä at Tuorla, Piikkiö on 1.7.2010, organised by MTT Plant Production, SJT Sugar Beet Research Centre and Countryside College of Southwest Finland Tuorla, 200 visitors.

In 2011: The project has organised 3 field days (2 in Finnish, 1 in Swedish). The press was invited to all organised events (Table 8). Each field day resulted in one press hit, 3 in total. A targeted group of agricultural media was called to mid-term seminar; invitation was made by KSS ry. Two of the field days were organised in co-operation with other agricultural exhibition in order to carve out wide publicity; a) Västankvarn Field Day on 7.7.2011, 1300 participants (Nylands region, organiser NSL), where also one demonstration field was presented with susceptible and resistant cultivars with no chemical control; and b) "Ruudun reunalla" field day in Jokioinen on 19.7.2011, together with the Plant Breeding Company Boreal Ltd, 150 participants. One demonstration field of PesticideLife next to the event area was presented during the event. The third field day was in Lapua, Pohjanmaa (Southern Ostrobothnia) on 27.7.2011, on a project demonstration farm, gathering 33 participants.

Otherwise, the project has been presented on a stand on Direct Drill and Protein Crops Day organised by two independent farmers in Loimaa 16.6.2011, 1000 participants; Cropping Day of K-group (one of the main agricultural and food trades in Finland) on 26.7.2011, 800 participants; Elonkierros field trip organised by Raisio Plc on 5.8.2011, 50 participants.

In 2012: The project has organized 4 field days (2 in Finnish, 2 in Swedish). The press was invited to all organized events (Table 8). 3 of the field days resulted in one press hit, 3 in total. One of the field days was organized in cooperation with other agricultural exhibition in order to carve out wide publicity; Stor-Sarvlax Field Day on 10.7.2012, 150 participants (Nylands region, organizer NSL). Other 3 field days were arranged independently in the demonstration fields. The first field day was in Västankvarn, Inkoo (Nylands region, NSL was the organiser) on 11.7.2012, on a demonstration farm, gathering 15 participants. Second field day was in Jokioinen, Häme region in MTTs auditorium and Kotkanoja demonstration field. 38 participants were present with press and 30 farmers. Third field day was in Southern Ostrobothnia in Ylistaro next to agricultural store where one of the demonstration fields was located. This event gathered 42 participants of which 34 were region's key farmers. Store keeper gave us feedback that impact was broad because of the key farmers and a representative of local magazine was present.

Project was present in Green week conference organised by EC in Brussels 22 - 25.5.2012 for the first time. PesticideLife was selected to LIFE area with 8 other LIFE projects. Nationally PesticideLife project has been presented on a stand on Okra agricultural exhibition with 71 500 participants in July, at Cropping Day of K-Group (one of the main agricultural and food trades in Finland) on 31.7.2012 with 500 participants; in Elonkierros field trip organised by

Raisio Plc on 10.8.2012 with 125 participants and in Lepaa horticultural exhibition together with other IPM projects and with 10 000 participants. KSS invited PesticideLife to give a presentation in their autumn seminar “Syyspuinti” 6.11.2012 where 150 people were present. Presentations about IPM methods in cereals have been given in several minor events, so that project staff has had 44 presentations in total in 2012 (see PR ANNEX 2 and 18).

In 2013: There were no field days in the last project year, but the project was presented in many other events during 2013. PesticideLife had a stand in Farmari agricultural exhibition in Seinäjoki 3.-6.7.2013. Project was also present in Västankvarn field day 11.7.2013 and Lepaa horticultural exhibition 15.-17.8.2013. Project was present in Green week conference organized by EC in Brussels 4-7.6.2013 for the second time. PesticideLife was selected to poster exhibition area among the other two LIFE projects (43 exhibitors in poster exhibition in total). The subject of the Conference was Air Quality and the title of our presentation was “Effect of plant protection products (PPP) on air quality in agriculture”. PesticideLife’s booth got plenty of visitors and project was also interviewed to the Life-news. The video can be seen in Life’s website.

(http://lifevideos.eu/videos/?id=LIFE13_GREEN_WEEK_13_01_EN_CONF.mp4).

KSS invited PesticideLife to give a presentation in their autumn seminar “Syyspuinti” 5.11.2013 where 120 people were present. Presentations about IPM methods in cereals have been given in several minor events, so that project staff has had 2010-2013 154 presentations in total. (see FR ANNEX 23). The plan for the prospective dissemination of the project’s results will be discussed in After Life communication plan.

All the seminars and field days have been advertised on popular Finnish agricultural websites without costs, like www.farmit.net, www.agronet.fi, www.kasvinsuojeluseura.fi and www.mtt.fi, as well as on the project’s website.

Objectives of the dissemination reached and completed in all project years. Total amount of participants in seminars and field days, where the project members have had a presentation, was over 6600 of which 1600 were farmers (FR ANNEX 23) and in agricultural exhibitions 20 2688 (FR ANNEX 24).

5. An opening, mid-term and closing seminar

For the participants of seminars in task 5, please see (Table 8) and (FR ANNEX 23).

The opening, mid-term and closing seminar schedules are well described in project proposal. We asked permission from the Commission to be flexible with organising the seminars: a possibility to separate the international and national part of the seminars timely and in a locational way and arrange 2 Nordic-Baltic meetings of 1–2 days instead of having it in every seminar. In feedback of MR (2.5.2012) we were asked to justify the reasons to this deviation in final report. By organizing international seminars in collaboration with NJF we got more publicity and participants as well. If we had organized these international parts of seminars in Finland, without binding them in wider international seminars, we would never have had such extensive international audience. In these international seminars project has been presented very actively in Nordic-Baltic and European IPM research community. In the budget’s travel costs, tens of experts were planned to be invited from Nordic Baltic countries to the project seminars. In the fulfilled organizing 6 experts from PesticideLife staff travelled to Sweden and Estonia, which should be cheaper than the planned system. This deviation had no negative affect the original targets and results of the project.

The opening seminar was held in MTT Jokioinen on 18.–19.2.2010, with 27 participants at the project's orientation day and 59 participants (farmers, state authorities, plant protection and production industries, stakeholders, NGO's) at the second day's public seminar. The first seminar day was chaired by the Senior Supervisor and the second day by the leader of Action 4 Prof. Sirpa Kurppa. Project plan was peer reviewed in the first seminar day by Management Board and the farmers, stakeholders and project partners. A press release was published and a press conference arranged before the seminar, resulting one press hit by leading agricultural newspaper Maaseudun Tulevaisuus 22.2.2010 (MR ANNEX 12b). The second day of opening seminar was public. A presentation on residues of plant protection products in surface waters was given by Senior Adviser Sari Autio from SYKE and 11 other presentations were presented. The seminar materials are available in Finnish and in English on the project's website.

The mid-term seminar was held in two separate days in co-operation with existent seminars. The international part of project's mid-term seminar was held as a Nordic-Baltic IPM-workshop at the 24th NJF Congress in Ultuna, Sweden. The workshop (speakers Dr. Kari Tiilikkala, Dr. Irene Vänninen and Prof. Dr. Sirpa Kurppa; 25 participants from Sweden, Finland, Norway, Latvia, Lithuania and Germany) resulted in formation of a NJF's permanent working group "NJF IPM working group", actively promoted by the Senior Supervisor. The IPM WG met the first time in the NJF seminar at Bäckaskog, Sweden, on 30.11.2011. The target of the IPM WG is to organize seminars under topical IPM issues. First seminar was organized in November 2012 in Tallinn, Estonia; this seminar was also the international part of the closing seminar of PesticideLife. The national part of the mid-term seminar was organized in Ilmajoki, Finland, on 1.11.2011. It was a joint seminar with traditional plant protection seminar "Syyspuinti" organised by Finnish Plant Protection Society KSS. There were 183 participants in the national mid-term seminar; 65 stakeholders from 15 interest groups, nearly 100 agricultural students, the rest being farmers and the press. The national seminar resulted in two press hits, Maaseudun Tulevaisuus 7.11.2011 and Kasvinsuojelulehti 4/2011, (MR ANNEX 12 b). The presentations held in the both seminar days are on the project's website (MR ANNEX 11a). Short translations are available in English (MR ANNEX 11b) and in Swedish (MR ANNEX 11c).

The closing seminar was also separated in international and national parts. The international part of the seminar was arranged together with the NJF IPM working group in November 2012 in Tallinn. The date of the seminar was one year earlier than in planned schedule, but by combining the closing seminar with the NJF's IPM seminar we got more interest and participants, than separate seminar in Finland could ever have reached. Co-operation with NJF working group supported also Action 4 task 3. The seminar was very successful and it gathered 80 top IPM experts from 13 countries and it was extraordinary possibility to discuss the central IPM themes in the international Nordic-Baltic level and to get the proceedings and presentations published also on NJF web pages.

The national part of closing seminar was held on 13th of November 2013. The seminar got over 100 participants e.g. farmers, advisors, researchers, teachers and students. After the seminar presentations there was 45 minutes time for the conversation. The audience was very active and we got good discussion about the current stage and future development of IPM. The final conversation was documented and published after the seminar in projects homepage as well as the proceedings of the seminar. The press invitation and press release were send before the seminar for the relevant medias and seminar resulted in two press hits (Maaseudun Tulevaisuus 18.11.2014 and The Finnish Cereal Committee's (VYR) web news 19.11.2014)

(FR ANNEX 25). We were also asked to write an article about the seminar to Kasvinsuojelulehti (publication of the Finnish plant protection society) 4/2013.

6. Production of brochures, films, visitor guides

Table 9. Project brochures

For the opening seminar	Deadline	Completed	Delivery to the COM
Finnish	31.1.2010	29.1.2010	IR ANNEX 6b
English	31.1.2010	29.1.2010	IR ANNEX 6a
Swedish	31.1.2010	29.1.2010	IR ANNEX 6c
For the mid-term seminar	Deadline	Completed	Delivery to the COM
Finnish	30.11.2011	24.10.2011	MR ANNEX 9a
English	30.11.2011	8.11.2011	MR ANNEX 9b
Swedish	30.11.2011	8.11.2011	MR ANNEX 9c
Ruudun reunalla Field Day in Jokioinen	Additional brochure	15.6.2011	MR ANNEX 9 d, 9 e
For the closing seminar	Deadline	Completed	Delivery to the COM
Finnish	30.11.2013	12.11.2013	FR ANNEX 17 a
English	30.11.2013	12.11.2013	FR ANNEX 17 b
Swedish	30.11.2013	12.11.2013	FR ANNEX 17 c

The first tri-lingual project brochure (IR ANNEX 6a, 6b, 6c) was published on the project's website 29.1.2010 before the opening seminar. The second tri-lingual project brochure (MR ANNEX 9a, b, c) was published in touch with the mid-term seminar (FI 24.10.2011, EN, SE 8.11.2011) (Table 9). The third multilingual project brochure was published before the closing seminar, 13.11.2013. All brochures have been published on the website and delivered to the participants at the seminars, field days and other events. Printed copies of the last brochures will also be distributed in several seminars and events in 2014 (more detailed in After Life communication plan). Two additional project brochures were published before the field day in Jokioinen in 2011, and first one was delivered to the participants of the 'Direct drill and protein crops' -day in Loimaa and field day in Nylands region (MR ANNEX 9d), and the second one to the participants of the 'Ruudun reunalla' -day in Jokioinen (MR ANNEX 9e). Graphic image of the project is based on MTT's visual image, with logos of Life, MTT, Tukes/SYKE and NSL.

Audiovisual material is displayed and geographically located on the web-album with around 2000 pictures <http://picasaweb.google.com/112009986095518455101>. The web-album is linked to project's website. We have made a selection of 10 pictures from the web album to give a short review of its contents. (FR ANNEX 14). Visitor guides (IR ANNEX 7, MR

ANNEX 7, PR ANNEX 7, Table 6) have been erected to selected demonstration fields (2010: 9 in Swedish, 16 in Finnish; 2011: 8 in Swedish, 18 in Finnish, 2012: 8 in Swedish, 18 in Finnish) and displayed on the project's website. We asked from Management Board a permission to postpone the DL for the erection of visitor guides from 31.3. to 31.5. The reason for this request was that the cropping plans of the farmers may not be ready before the end of May. The site visits per year are at least 98 in 2010, 1423 in 2011 and 95 in 2012. (annual amount of participants at the field days organised by PesticideLife, please see Table 8); some of the fields may have attracted other visitors as well, while they are located close to the side roads and there were notice boards erected.

The shooting of film was started in May 2012 and all three films were finalized in autumn 2013 and published in *Vimeo* video service in web (FR ANNEX 18). The links can also be found from project's web page. The original length for the film according to the project plan was 3 hours. Set goal of three hours of edited film material seemed to be quite a lot; we estimated that a realistic goal would be 0.5 –1 hour and that will serve the education purpose best. With the budgeted amount of money (60 000€ for all purposes in action 2) it is more reasonable to produce a shorter, well-targeted, high-quality film instead of huge amount of low-quality film. We got permission in our progress report's feedback (14.3.2013) to make a shorter, 30 to 60 minutes film about the IPM in cereal farms. We got an offer from a company best value for money after tendering. The video was divided in three parts. The first (18 min) part addresses the general principles of IPM (<http://vimeo.com/74633846>) and second (16 min) part introduces the pest-specific control instructions for cereal farmers (<http://vimeo.com/75228700>). The third video is a 5 minutes summary of IPM methods (<http://vimeo.com/77384985>). The language of films is Finnish. The films were presented in national part of the closing seminar, 13th of November 2013. We have offered films for the educational purposes for all Finnish agricultural colleges/universities. The films have received a warm welcome among the teachers of these academies. According to the agreement the price for videos was 17 000€ + VAT. The realized eligible cost for the service was 13 708,82€ + VAT, because one of the invoices was paid in 2014 for the sake of supplier's human mistake.

7. Technical publications of the project (proceedings)

In MR we asked for approval to be flexible with the language versions of the technical publications. In feedback of MR (2.5.2012) our approval was accepted, but the reasons for these deviations were asked to validate in FR. Technical publications are completed according to the project plan. The opening seminar was held in Finnish, and the publications were published in FI and in EN. The mid-term seminar was held in EN (international part) and in FI; the proceedings of the national part was translated also in SE and EN. The proceedings of the international part of closing seminar were published in EN (NJF report 458) and the proceedings of national part of the seminar were published in FI, EN and SE.

Proceedings of the opening seminar (Table 10) are published in Finnish (IR ANNEX 8) based on the seminar presentations (167 slides; printed in 83 pages including e.g. participator list). It was delivered in the seminar and published on the website right after the seminar. The English translation of the proceedings (IR ANNEX 8 b) was published during August on the website (160 slides). The decided change in Action 5 task 5 (see above) makes it logic to publish the Nordic-Baltic proceedings in English, and others in Finnish and/or Swedish. Proceedings of the mid-term seminar (Table 10) are published on the project's website immediately after the seminars and a) the international part is in English, (MR ANNEX 10, 24 pages); b) national part is in Finnish (MR ANNEX 11a, 54 pages), English (MR ANNEX 11b, 22 pages) and

Swedish (MR ANNEX 11c, 31 pages); SE and EN are short translations of the Finnish part. The printed proceedings of the national part were delivered to the seminar audience.

Proceedings of the national part of closing seminar (Table 10) are published in Finnish, English and Swedish (FR ANNEX 19 a,b,c). The proceedings were published in Finnish (13.11.2013) and translated in English (20.12.2013) and Swedish (31.12.2013). Also the final conversation of the closing seminar was documented and translated into English and Swedish. The length of the proceedings is: FI 152 slides, EN 144 slides and SE 49 slides. The proceedings of international part of the closing seminar were published and dealt to the participants in the seminarium. The Proceedings of the seminar are also available in the project's and NJF's websites. The language of the publications is English and both abstract book (51 pages, PR ANNEX 9a) and slides are available via internet. The links can be found from project's website.

New blog and active updates in social media have been done according to Life instructions. Blog has gathered about 1500 readers by December 2013. PesticideLife in Facebook: <https://www.facebook.com/pesticidelife?ref=sgmPesticideLife>
<http://pesticidelife.blogspot.fi/>

Table 10. Actualized results of dissemination are listed. The schedule of the Action 5 follows the Gantt-chart (FR ANNEX 1).

	2010	2011	2012	2013	Total
Notice Boards	34	41	40	15	129
Website visitors per month, up to	2500	1500	1200 + blog	350 + blog	--
Press conferences	1	1	0	0	2
Press meetings	2	4	3	1	10
Press releases	4	2	2	1	9
Articles for the press	4	7	24	25	60
Seminar days	2	2	2	1	7
Brochures (FI EN SE)	500	700	400	500	2100
Films (hours, edited)	0	0	0	0,75	0,75
Photos	240	750	540	470	> 2000
Visitor guides	26	26	26	0	78
Proceedings, distributed also electronically	100	200	80	120	500

5.3 Evaluation of Project Implementation

General implementation

All the project objectives, deliverables and milestones planned in the Grant Agreement could be reached in the planned time schedule during the project execution. The targets and their

schedules are described detailed by Actions in the text, tables and appendices of this report. The constraints supposed to be met over the project period were opened in Grant Agreement by Actions. None of them realized seriously. We were lucky to have variable weather and pest conditions for three demonstration years. In 2011-2012, plant disease infestations in cereals were strong, which produced huge amount of information for disease management. Insect amounts are seldom high in cereal production, only once per 10-15 years. In the demonstration years the threshold values for aphids exceeded only in one of three areas and the reliability of threshold values could not be proved in the project.

By recruiting to this project many of the best Finnish experts in the PPP field, we reached the best possible understanding of risks and constraints threatening the performance and quality of PesticideLife project. Therefore, we could foresee, win or avoid many of the difficulties. Some of the project staff had also long experience about the quality systems in the research field which might help in implementation of the project plan. Most of the project experts had steady and practical relationships with many stakeholders and Nordic Baltic experts of plant protection, which helped in the transmission and bilateral invocation of project results between different interest groups.

Action 1

In the Actions 1, 2, 4 and 5 we collaborated very tightly together and, therefore, the evaluation of many duties separately by actions is challenging. All nine demonstration farmers remained involved and enthusiastic through the demonstration process. They gave feedback regularly; in summertime almost weekly and more detailed in the yearly local feedback meetings. Mutual knowledge change between the project staff and different stakeholders existed in numerous official and unofficial events. In this interaction process the understanding of significance of NAP and IPM in the sustainable plant production increased. Especially after the end of field demonstrations in 2013, the collaboration in the internal and external reference groups was very active when developing IPM portal and IPM-matrix together in 16 bigger meetings or seminars. Two information days with the collaborative farmers (2012 and 2013) gave many ideas and solution models for the farmers and project specialists.

Action 2

Three rotations (2010—2012) of field demonstrations on three regions, 9 farms and 77 cereal fields succeeded well. All fields could be harvested and the profitability and influence of realized IPM methods could be evaluated by the project staff. Although the three regions were located in distance of 200-400 km from each others, the differences in the results between the areas were diminutive. The well educated technical employees on each area and the enthusiasm and willingness of the demonstration farmers ensured the reliability and availability of the results.

Action 4

In Action 4 the pioneering working with HAIR2010 risk indicators and Usetox model assured the possibility to develop a procedure where the vertical and horizontal risks of PPP usage in cereals could be measured in Finnish conditions. The availability of this model comes through only if this work can be repeated after e.g. 3-5 years period. We produced the directions for HAIR working in Finnish. Financing will be applied for continuing this evaluation work. In this work we used the PPP usage data gathered by the authority TIKE as a pilot survey in

2007 for the EU statistic regulation. This base gave more credibility and motivation for our study, too.

Action 5

In Action 5, dissemination material produced under project period in 2010-2013 was very rich and diverse, and all this information was deeply desired by the public. Announcement was concentrated to the farmers and advice, but the whole audience proved to be very broad. Electronic dissemination focused on the project website which was an economical key side. Printed material, like brochures, Layman's reports and MTT Report publications, were also marketable. Material linked from the websites, e.g. educational IPM videos produced in the project, has been in demand, too. The information throughout the oral presentations (154 in four years) of the project staff spread positive impact of the attitude formation in the area of sustainable plant protection. Dissemination proved to be the most motivating part of PesticideLife project.

Action 6

In the four years project period, many new administrative and communication programs and procedures were developed and taken in use. That caused needs to react, make new regulations or guidelines and have advising discussions with external monitor or/and Commission. That caused often additional work in the transitional period. Some changes are described in this report. Project Expert was the only fulltime temporary worker in the project and her duty as a coordinator of whole project was essential. In the course of four years project three different persons were nominated to Project Expert, when the former employee was recruited into another permanent post. This naturally caused additional challenges for the project execution, when these persons started from the first beginning, three times. However, we succeeded in the recruitments, and when reviewed afterwards, this might bring richness for the project and we could educate three experts for IPM field in Finland.

Action 7

Internal monitoring of project proved to be useful and when we could use the competent quality manager of MTT in this task, we could manage very well with one third (3 months) from the total planned work load to this post. Internal Monitor brought in practice the regular risk assessment and analysis measurement for PesticideLife. Risk analyses were carried out twice both in 2012 and 2013.

5.4 Analysis of long-term benefits

1 Environmental benefits

Direct / quantitative environmental benefits:

The PesticideLife project was the first one in Europe which validated the HAIR2020 risk models in practice and our feedback has lead to improvement of the software. The development work of the risk indicator was one task of Action 4 (see more: action 4, task 1-2, page 30). The decrease of the environmental risks in use of pesticides caused by adoption of IPM methods can be measured with the developed measurement. The indicators are planned so that they can be applied by authorities and they are useful in measuring the changes only if

the measures can be repeated after a time period. The adoption of these methods and utilizing in long term measurements need both political decision making and economic support.

Relevance for environmentally significant issues and policy areas

The PesticideLife project has a clear linkage to the environmental policy of EU. The results of the project can be used in implementation of frame directive of sustainable use of pesticides (2009/128/EY) in national level. The project has produced knowledge for producing and implementation of National Action Plan (NAP). Five persons of the project (Junnila, Markkula, Tiilikkala, Autio, Erlund) were nominated to the national committee which wrote the suggestion for NAP in Finland. The NAP was published by the Ministry of Agriculture and Forestry in March 2011¹. One unplanned impact of the project came true when the Finnish Safety and Chemicals Authority (TUKES) nominated the national NAP coordinator in the beginning of 2012. Project Expert Pauliina Laitinen was chosen among 46 candidates. Her knowledge on IPM was very visible in the PesticideLife project, and it was highly esteemed when the most important IPM post for Finland was filled. TUKES was luckily one of the project partners, so the knowledge of Pauliina Laitinen did not vanish entirely from the project either. In addition, Project Manager Sanni Junnula was nominated as a representative of MTT into NAP steering committee, which follows the implementation and updating of NAP. The committee has had two meetings in 2013. In all sectors, the knowledge of PesticideLife specialists has been essential in preparing, implementation and evaluation of NAP. Reducing the risks of pesticide use will support promoting the goals of the 7th environmental action program (EAP) of EU. The role of PesticideLife has been remarkable in educating new experts and educators to the field of IPM. After PesticideLife project, Finland has 10 new IPM experts ready to spread forward their knowledge in the field of sustainable plant protection.

2 Long term benefits and sustainability

Long-term / qualitative environmental benefits

In long term, the environmental benefits can be achieved by adopting new technologies in plant protection. PesticideLife has tested and validated existing methods, like threshold values for insect pests and cereal diseases. Also project has tested and developed new plant disease forecast model that can be seen as a new technology to help farmers in decision making and using plant protection products only for noted need. Active role in producing educational material and sharing knowledge in plant protection education will ensure that the IPM knowledge is spreading forward also after the project.

Long-term / qualitative economic benefits

In long term, the economical benefits can be achieved when farmers learn to utilize IPM methods in observation and recognizing pests and use pesticides only for noted need instead of time and money wasting routine sprayings. Utilizing of biochar in reducing the leaching of agrochemicals is a novel possible technique that already now interests the commercial companies.

Long-term / qualitative social benefits

The PesticideLife project has increased co-operation and trust between different action groups, e.g. farmers, authorities and researchers. Common learning has been one of the key factors in success of demonstrations. If the preliminary plans of utilizing IPM portal also as a tool for consumer communication come true, it can help to create open communication

between farmers and consumers. This can increase understanding and respect between these groups.

Continuation of the project actions by the beneficiary or by other stakeholders

Although the PesticideLife project has ended, action will continue by spreading the results and knowledge that was produced during the project. There is still need for expanding the IPM knowledge. One way to continue this project in MTT is to collect all available IPM knowledge in matrixes. The jointly done work has already been a bases for the recently started projet: “C-IPM - Coordinated Integrated Pest Management in Europe, FP7-ERANET”. The overall goal of C-IPM is to create synergies from investments in national research programmes, European initiatives, and private sector activities in the areas of IPM and minor uses to ensure a higher level of implementation of IPM among European farmers. On national level the matrixes could serve also as an information source for the forthcoming IPM portal work (p. 18-19) and will be used as a valuable tool for focusing research on the most critical information gaps. The results of the project have already been transferred in law-based new plant protection education that is organized by Tukes. Both project specialists and projects materials have been and will be in a key role in integrating IPM knowledge in plant protection education. All project results are available via project’s home page and for example, the teachers of plant production in Finnish agricultural high schools have been informed about this material by e-mail. The ecological farming research is broadening in near future at MTT and biological plant protection will be one of the key topics there. The continuation of the projects actions is described more detailed in After Life communication plan (FR ANNEX 21 a,b).

3 Replicability, demonstration, transferability and co-operation

All material is practical and recoverable for free by internet for advisors, teachers, students, researchers and everyone who is interest in sustainable plant protection in cereal production. The results can also be applied in Nordic-Baltic area, because of the closely similar climate and plant production conditions. PesticideLife has produced Layman’s Report and three other reports in English (A synthesis report on implementation of IPM and MTT Reports 105 and 109, FR ANNEX 11, 10 and 6), which are easy to disseminate also in international level. Nordic-Baltic networking has been built up by Senior Supervisor Kari Tiilikkala when NJF (Nordic Association of Agricultural Scientists) decided to establish the NJF IPM working group from the initiative of PesticideLife in 2011. The working group is an essential way for sharing IPM knowledge in Nordic-Baltic forum. This group has planned to survey common research needs and prepare the IPM Pilot Farm network in the Nordic-Baltic area.

4 Best practice lessons

PesticideLife was a demonstration project that tested the methods of integrated pest management in farm and field scale. As a preventative method, the sufficient crop rotation was found to be very important in reducing plant protection problems. The main tested methods in addition to cultivation techniques were threshold values, plant disease and aphid prognoses, use of control windows, prevention of pesticide resistance, record keeping of observations and the identification of pests. In addition, the WisuEnnuste plant disease forecasting model was tested in selected barley and wheat fields. Over the course of the demonstration years, the threshold values and observation methods for plant diseases and pests were modified to be better suited for practice. Also WisuEnnuste for plant diseases was validated during the three years test use in demonstration fields. Information regarding the use of pesticides in cereal production from the 2007 pilot survey was used as a basis for the modeling of the ecotoxic impacts of pesticides on the water environment. HAIR risk

indicators, developed in EU, were in research use for the first time in Finland and even more extensively in Europe. The new procedure has been described in the project report (MTT's Report 105, FR ANNEX 10) and it can be further developed for authority use to measure the change in the risk caused by pesticide usage once IPM is introduced.

5 Innovation and demonstration value

Risk of glyphosate leaching from fields to water systems has been observed in the residue surveys analyzed from Finnish water systems and also in the water samples gathered from the demonstration fields in Jokioinen area (see Report delivered on 31.11.2013, FR ANNEX 11). Preliminary tests were done in the greenhouse to see if Biochar can be used to adsorb glyphosate from water run-off. Glyphosate and AMPA residues in the filtered water samples were analyzed. Our preliminary results indicated that wood based Biochar could be used to decrease leaching of pesticides. New technologies need to be developed for the use of Biochar in fields with high slope or for novel underdrain systems. Use of Biochar is an innovation which may have high value in the future. In a separate, Tekes (=Finnish Funding Agency for Technology and Innovation) funded project HIDASPYRO II the impacts of Biochar applications are researched more thoroughly in a green house experiment. Results of the HIDASPYRO II project will be published in the final report of the project in June 2014 (VTT technology report) The first results of the HIDASPYRO II project have been published in an international seminar in Norway².

6 Long term indicators of the project success

When the PesticideLife project started in 2010, the terminology and methodology of IPM was almost unknown among the Finnish farmers. IPM as a concept was not clear even for the researchers in plant production sector. During the project years the understanding what IPM means has clarified both for the demonstration farmers, for researchers and many other stakeholders. The one mission of the project has been to spread IPM knowledge via field days, seminars, farmer meetings and many other events. PesticideLife has also published several articles, brochures, videos and other publications. In long term we hope that all this information will be in wide use and the lack of knowledge is not an obstacle in utilizing IPM methods in farmer's work. PesticideLife's results are now in educational use both in agricultural high schools and in law based plant protection education and we hope that this now educating generation will adopt these methods in their own work. The HAIR-risk indicators that were now first time applied in measuring the environmental risks of pesticides have been offered for the authorities in Tukes a measurement for long-term follow-up in the development of environmental risks of pesticides. The project success can be followed by the indicators listed below:

- Number of farmers attended IPM courses in Finland
- Number of farmers and other IPM specialists having plant protection qualification certificate
- Number of IPM pilot farms in Finland
- Number of new national IPM projects in Finland
- Number of international IPM projects
- Reference index values of the project publications
- Number of web hits and down loads from the PesticideLife home page
- HAIR software development based on the validation work of the project
- Number of IPM presentations given by the PesticideLife experts after the project

Literature:

¹The Ministry of Agriculture and Forestry 2011: Suggestion for the national action plan concerning sustainable use of pesticides (in Finnish).

http://www.mmm.fi/attachments/mmm/julkaisut/tyoryhmuuistiot/newfolder_25/5xCfswKPg/trm2011_4.pdf

²Tammeorg, P., Helenius, J., Simojoki, A., Mäkelä, P. and Stoddard, F. 2011: Biochar field experiments in Finland: first results. – 1st Nordic Seminar on Biochar, 9.-10. November 2011, Oslo, Norway. Presentation: <https://www.slf.dep.no/no/miljo-og-okologisk/klima/klimaprogrammet/undersider/Nordisk+Biokullseminar.16318.cms>

6 Comments of the financial report

Please note that the project partners SYKE (from 1.1.2010 until 31.12.2010) and Tukes (from 1.1.2011) have both filled and signed their own financial tables. This is because Tukes cannot sign and be responsible of the financial issues of the other organization and authority. Even if an organizational and law based change in 2011 transferred some functions from SYKE to new agency Tukes, including the actions that considered the PesticideLife –project, SYKE is still existent and it is responsible of its financial issues. The change of the project partner from SYKE to Tukes is described more detailed in MR chapter 4.2.

Realization of the project cost by the cost categories

Total costs

In the Grant Agreement the portions of the budgeted costs of each cost category from the total costs were: personnel costs 82 %, travel 3 %, external assistance 13 % and consumables 2 %. The portions of realized costs after the project period were, respectively 85 %, 3,6 %, 9,2 % and 0.6 %. In addition, a new category “Other costs” was opened and 10 000 € was removed from the External assistance category there with the acceptance of Commission in the feedback of MR on 2.5.2012. The category other costs reached then 1.6 % of total costs (15 850 €). The changes in the total costs by actions reflected naturally strongly the changes in the proportion of the personal costs by actions (see below Table 11, Project costs incurred).

Personnel costs

The increase of the personal costs during the project period was 9.9 % from the budgeted. The increase was very even by actions. Only in action 5, dissemination, the portion of real salary costs was higher, 16 % from the total personal costs, when this proportion was 12 % in the budget. In actions 1 (partnership) and 7 (monitoring), the relative portion of the realized personal costs remained lower than budgeted. The implementation of demonstration farmers and stakeholders into the project was asked to be done beforehand already in summer 2009, which decreased the work load and personnel costs in action 1. In action 7, the planned working time of Internal Monitor, 8 months in total, was seen unnecessary high and the required job could be done with about one third of this work load (3 months). According to the original project plan, the planned work months of the permanent staff were about 83 months and of temporary staff 102 months. The realization of working months was for permanent staff 72 months and for temporary staff 102 months. Main reason for the increase of personnel costs was the rise of salaries from the beginning of 2010 to 2013 by 22,5 % in total, according to the official state salary contracts. In the Grant Agreement the personal costs for the permanent employees were 393 627 € and for the temporary staff 392 930 €. The realized personal costs were 446 472 € for the permanent staff and 417 957 € for the temporary employees.

Travel

The level of the travel budget was predicted to be too low soon after the start of the project. In the MR we asked permission to move 12 500 € (from the external costs 10 000 € and from Durable goods equipment 2 500 €) to the category travel which got the acceptance of Commission in the feedback of MR. We also noticed that the realized travel prices were clearly higher than planned some years before. In the actions 2 and 4, the travel costs increased from the original sums 2.5 fold and in the action 5 1.5 fold. Reason for this was more active and rich collaboration and networking in the IPM implementation with the experts at Nordic-Baltic and European level than planned beforehand (please see FR ANNEX

28, International travels and costs). In the original project plan there were no planned travels outside the EU and even the travel expenditure inside the EU were not exactly foreseen. During the project years, there was one travel directed to Norway, which is outside EU but belongs to the Nordic countries. On 12th October 2011 project expert Pauliina Laitinen attended with the poster presentation to the Nordic Meeting on agricultural Statistics NJF seminar 442 in Norway. Outside Nordic-Baltic region experts of PesticideLife project travelled four times. PesticideLife participated in two Green Week Conferences (years 2012 and 2013) in Brussels, Belgium, according to the plans in the Grant Agreement. The other two travels outside N/B-region were directed to France and Poland. Project Expert Pauliina Laitinen and Senior Supervisor Kari Tiilikkala attended the Final seminar of European ENDURE IPM expert network that was held 23th of November 2010 in Paris. Because of the contacts in Paris, Senior Supervisor Kari Tiilikkala attended as an invited speaker to a conference “Sustainable use of pesticides and integrated pest management in East-Central Europe and the Baltics” (ENDURE IPM expert network) in Poland 5th of September 2011 giving there a presentation about the NAP programs of all N/B countries.

International parts of the MidTerm and Closing seminars were organized in Sweden, Uppsala and in Estonia, Tallinn, respectively. The travels were made by ship which decreased their expenditure compared to travelling by flight. These arrangements brought us big number of foreign participants and broad delivering of seminar publications (see more page 42).

External assistance

After accepting the Grant Agreement it came clear that the realization of many planned costs in this category will be realized differently and the realization will remain lower. In Action 2 17 250€(in total) was paid for the demonstration farmers as a compensation of a crop loss and harms in 77 demonstration fields. Demonstrations caused yield losses because the farmer was committed to leave untreated test plots in his cereal fields for research use. In action 2, PesticideLife could use the map and weather forecast data services of MTT free of extra charge. The action 3 with many chemical analyses was deleted by Commission just before the acceptance of Grant Agreement. Therefore, the number of chemical analyses decreased and only few glyphosate analyses were done by external assistance. MTT's own personal could build up the analysis method for glyphosate and AMPA in 2013 for another research project called GLYFOS and PesticideLife project paid one month salary for MTT's chemist for the analyses of water samples from two different demonstration fields of PesticideLife project located at Jokioinen area. In action 5, web pages and other IT processing were made by project expert and MTT's own personnel without paying the service via external assistance. Data processing in action 2 was made by permanent employees of MTT without budgeted external assistance costs. Also in action 7, internal monitoring was made in 2010 by a temporary worker and from 2011 by the permanent employee, the Quality Manager of MTT and external assistance was not needed. The external audit was done by PricewaterhouseCoopers Oy (PWC) and the costs (6.768,85 €) were allocated to external assistance in action 6.

Equipment

In the original financial application 2 500 € eligible costs were allocated to equipment category. This sum was allocated for programming (action 4) and computer and data transfer costs (action 6). After compiling the budget, it emerged that planned tasks could be done without allocating costs. HAIR-indicators and Usetox-model could be used via authorities in Tukes and use of MTT's IT-services is free for MTT's personnel. Undercut of the budgeted did not cause any drawbacks to the project. The budgeted 2 500 € was transferred from the

equipment category to the travel category. The approval to this modification was asked in MR and in the feedback of MR (2.5.2012) these modifications were accepted providing that the justification would be done in final report.

Consumables

Realization of the category consumables remained far behind the budgeted being 33,8 % from the budgeted costs of 18 220 €. The main reason for such undercut is that action 3 was deleted from the project plan very late and the sum that was allocated to the chemical analyzes was over estimated in relation to remaining actions (mainly action 2). The chemical analyses for the remaining actions could be done by the MTT's permanent chemist and there was no need for buying budgeted expensive diagnostic kits. For action 2 planned costs (10 000 €) and targeted jobs were covered by one month personnel costs of the chemist in 2013 and by the payment of chemical analysis made by Rambol in 2011 allocated in external assistance. In addition, there was no need to use budgeted 2 000 € for the publication costs of internal monitoring, because the monitoring could be done and reported by MTT's Quality Manager. Some of planned costs were covered in the category other costs.

Other direct costs

This category was opened at MR and it reached about 16 000 €. This sum was mainly composed of 5 117 € in action 4 and 9 751 € in action 5. These costs include e.g. participating fees of international seminars and the stand rents of the seminars, catering costs of the events like field days and costs of advertising project's national seminars and events in newspapers (FR ANNEX 22). Seminar and congress fees were not foreseen separately in the proposal. We were asked in the MR feedback (2.5.2012) to include the seminar fees in the category 'Other costs'. The NJF's Nordic-Baltic seminars and conferences were a major channel to share IPM knowledge with the research community in the Northern Zone. The seminars were held in Nordic-Baltic countries, including Norway. These seminars have regularly a participating fee. All seminar participants have had a presentation or a poster presenting about the goals and results of the project. The number of participants in the international conferences and seminars was limited to those for whose attendance there had a valid justification.

6.1 Summary of Costs Incurred

During the project period no financial amendment was applied for the Commission. However, in the MR (MR chapter 3.2) we asked some modifications for the project budget and got in principle an acceptance for them from the Commission (2.5.2012). The modifications were to travel expenses 12 500 € and to other costs 10 000 €, which were removed from external assistance 20 000 € and from equipment 2500 €. **However, in the tables 11 and 13 the unchanged budget values of Grant Agreement are reported.**

Table 11. Budgeted eligible costs spent and percentage of costs spent reviewed by cost category, including overheads.

PROJECT COSTS INCURRED			
Cost category	Budget according to the grant agreement*	Costs incurred within the project duration	%**
1. Personnel	786 556,00	864 429,84	109,9 %
2. Travel	22 800,00	37 393,93	164,01 %
3. External assistance	125 000,00	93 594,49	74,88 %
4. Durables: total <u>non-depreciated</u> cost	0,00	0,00	0,00 %
- <i>Infrastructure sub-tot.</i>	0,00	0,00	0,00 %
- <i>Equipment sub-tot.</i>	2 500,00	0,00	0,00 %
- <i>Prototypes sub-tot.</i>	0,00	0,00	0,00 %
5. Consumables	18 220,00	6 165,57	33,8 %
6. Other costs	0,00	15 853,45	??
7. Overheads	66 855,00	67 017,29	100,24 %
TOTAL	1 021 932,00	1 084 545,27	106,13 %

*) If the Commission has officially approved a budget modification indicate the breakdown of the revised budget. Otherwise this should be the budget in the original grant agreement.

***) Calculate the percentages by budget lines: e.g. the % of the budgeted personnel costs that were actually incurred

When counting the evidence for the 2 % regulation we have used the table template which SYKE has expressed in their earlier LIFE+ projects. In this template the own contribution (1) is total costs minus EU contribution. The personal costs of permanent staff (2) are the realized salary costs of permanent employees plus 2 % of them. To show the evidence for the 2 % regulation we count point (1) minus point (2). (FR ANNEX 29)

6.2 Accounting system

Accounting system of MTT

Accounting at MTT is performed using a financial management system called AdeEko+. MTT uses the electronic travel management system called M2. In M2 system, the travel plans and invoices are allocated to the project by using the project and action codes. The travel plans and invoices are checked both by the factual vericator and acceptor who is Group Manager of Plant Production Jokioinen. Electronic processing, routing and archiving of purchase invoices and receipts are performed in a system called Rondo. The invoices are verified by PesticideLife project staff and accepted by Group Manager electronically. As a part of consolidated government accounts, MTT issues each month a monthly financial statement in a predefined format. The data therein will be transferred to the central accounts managed by the State Treasury. As the monthly financial statement is completed, the accounting data for projects is also updated with the actual working hours and salary costs incurred during the month. The annual financial statement, too, is transferred to the central accounting at the State Treasury to be included with the consolidated government accounts. In the accounting system the project code 21090039 was used to allocate the costs to the project. In addition, the project's costs were allocated by actions by using six sub-codes. The project partners allocated the costs to the project by using their own codes for PesticideLife (see below).

Working hours at MTT are tracked comprehensively by timesheets filled in by employees. Life+ timesheet forms were used between 1.1.2010 and 31.12.2011. After that MTT moved to SoleTM system, which is an electronic working hour allocation system. In the timesheets, the daily working hours are allocated to projects and tasks, using the actual working hours. The working hours can be viewed by unit, area of responsibility, research project and person. The electronic working time registration system does not calculate the actual working time automatically even though the absences are visible in the printed records. Therefore, according to the PR feedback from Commission (14.3.2013) the handwritten additions to the printed records were evaluated acceptable.

The direct salary costs of a project are obtained by running a report in AdeEko+ that outputs the actual working hours logged to the project (effective working hours) and salary costs (salaries and indirect employee costs). The indirect employee costs included in salaries consists of a person insurance, accident insurance, and social security costs. The indirect employee costs vary a little from year to year. They amounted to 21,96% in 2010, in 2011 22,582%, in 2012 21,935% and in 2013 21,361%.

It was made sure by the project staff that all invoices contained the acronym "PesticideLife" as an identifier. Also the projects nick-name "Peli" could be used in some cases. (Peli means "game" in Finnish, so this un-official term was easily adopted). Most of the invoices at MTT were also marked with the project code 21090039. In the financial worksheets of project every invoice was allocated to the certain action by adding manually the Action code.

Accounting systems of project partners

Project partner **Tukes** used a financial management system called Raindance. The travel invoices are handled with the electronic system called M2 like at MTT. Tukes has not allocated any procurements to the project, all cost have been either salary costs or travel costs.

Tukes used code 111KSM001 to allocate the costs to the project. Allocation of working hours happened in electronic working hour allocation system called Nexthour. The working hours per project were allocated in accuracy of 15 minutes and working time recorded daily by employee. There is no electronic approval system for working hours, but working hours per project per month can be printed out from the system, and team leader has checked time reports of PesticideLife monthly. The employees have also timecards but this system records only person's arrival and leaving time and lunch break daily, it cannot allocate hours per project. The project code used by Tukes was 111KSM001 PesticideLife.

The financial management system in use in **SYKE** (in 2010) is called AdeEko+. The project code used by Syke was XSZ023_PESTICIDELIFE-PROJEKTIN KASVINSUOJELUAINI and XZ023. The travel invoices were handled with the electronic system called M2, like in MTT and Tukes. The daily working hours were recorded in the electronic system Taika, but monthly LIFE+ record sheets signed by the employee and the division manager were submitted for this project.

Project partner **NSL** used financial management system called EMCE and salaries are managed with a Microsoft Excel software application. The working time of the employees was monitored monthly according to the hour and service report. Travels are reported in connection with the approval of the travel invoices. Working hours were tracked comprehensively by Life+ timesheets filled in by employees. The Manager inspected the working time reports and travel invoices every month before they get the approval of the Director. The invoices are accepted by the Director. The invoices that are straight related to employee's assignments are first inspected by the employee and then transferred to the Director for approval. NSL has used code Kohde 420 PESTICIDE LIFE to allocate the cost to the project.

6.3 Partnership arrangements

First Partnership Agreement between the project partners was signed in May 2010 and delivered to the partners in 11.6.2010. Because of the content of the Supplementary Agreement signed 10.6.2011, which explained the change of partner SYKE to partner Tukes from the beginning of 2011, new agreement was signed in March 2011. In this document, the project partners, the target, object, duration and execution of PesticideLife project were represented. Also the way, rate and schedule of the EU financing payments and administration of the project, like also reporting, ownership and use of the results were described. All guidelines of Partnership Agreement have been followed during the execution of PesticideLife project. Project has got two advance payments 8.12.2009 and 3.5.2012 from Commission. Coordinating beneficiary has ensured that both associated beneficiaries have got their share of funding according to the Grand Agreement right after the payment.

6.4 Auditor's report/declaration

External audit was done by PwC Julkistarkastus PLC based on the MTT's contract on auditing EU projects. An agreement has been done with the auditor Topi Katajala at PwC. Please find the independent audit report as an appendix of the financial report of the FR (FR ANNEX 30).

6.5 Summary of costs per action

Table 12. Allocation of the costs incurred per action.

Action no.	Short name of action	1. Personnel	2. Travel and subsistence	3. External assistance	4.a Infrastructure	4.b Equipment	4.c Prototype	5. Purchase or lease of land	6. Consumables	7. Other costs	TOTAL
1	Partner	46 110,77	922,37	0,00					9,30	0,00	47 042,44
2	IPM	441 304,01	12 009,44	50 765,55					5 811,48	871,06	510 761,54
4	Comply	128 206,74	10 736,20	0,00					0,00	5 117,52	144 060,46
5	Dissemination	138 765,08	12 700,76	36 060,09					197,63	9 751,52	197 475,08
6	Management	91 016,61	1 025,16	6 768,85					147,16	113,35	99 071,13
7	Monitoring	19 026,63	0,00	0,00					0,00	0,00	19 026,63
											0
											0
Over-heads											67017,29
	TOTAL	864 429,84	37 393,93	93 594,49	0,00	0,00	0,00	0,00	6 165,57	15 853,45	1 017 437,28

Table 13. Comparison between the budgeted and incurred costs per action

Action no.	Short name of action	Budgeted total	Incurred total	%
1	Partnership	64 486	47 042,44	72,9
2	IPM	472 719	510 761,54	108,0
4	COMPLY	126 203	144 060,46	114,1
5	Dissemination	140 199	197 475,08	140,9
6	Management	90 015	99 071,13	110,1
7	Monitoring	63 955	19 026,63	29,8

Allocation of the costs incurred per Actions compared with the budgeted costs.

Action 1: Partnership

Total costs of action 1 were 72,9 % of budgeted costs. The main reason for undercut was that part of the work planned was asked to realize already before the project period like involvement of farmers and stakeholders.

Action 2: IPM

There was no remarkable deviation between budgeted and incurred total budgeted costs. The overrun of 8 % of budgeted is mostly explicable in terms of the increased personnel and higher travel costs than estimated, see page 53.

Action 4: COMPLY

The total incurred costs were about 14 % higher than estimated. The overrun of 14 % of budgeted is mostly explicable in terms of higher travel costs than budgeted because of active network with Nordic Baltic IPM experts and underestimation of travel expenditure in Grant Agreement. There was no budgeted other costs, but 5 117, 52€ of other costs was allocated to action 4. They were mainly participation fees of seminars.

Action 5: Dissemination

The total incurred costs were about 41 % higher than estimated. The travel costs of the action were about 4700 € higher than estimated and personnel cost exceeded about 38 564 €. There were no budgeted other costs, but 9 751, 52€ of other costs was allocated to action 5. The

realized publication work exceeded the planned volume and dissemination was seen one of the most impressive part of the results in the PesticideLife project.

Action 6: Management

There was about 10% deviation between the budgeted and incurred costs of this action. The main reason for 14% higher personal costs compared to the budgeted costs here was the increase of state salaries during four years period with 22.5 %. When the audit done in February-March in 2014 was included, the total costs became higher than planned in the budget. Costs of audit were 1770 €higher than budgeted in Grant Agreement.

Action 7: Monitoring

The total costs of action 7 were only about 30 % of estimated costs. The reason for overestimation was that in real life the internal monitoring took only 3 months instead of planned 8 months during the project period. This work was mainly done by the Quality Manager of MTT and buying this service as an external assistance was not needed. There was no need to use the budgeted 4 000 €for travels in this action. Collaboration with the partners happened in the video conferences and by e-mails.

7 Annexes

All annexes of the FR are delivered in paper copies and a USB memory stick. Reference to a certain file or folder in the USB stick are nominated with ANNEX x. Annexes of the financial report are listed in section 8.

Table 14. Annexes of the final report

ANNEX 1	Gant Chart / ANNEX 1 Gantt_Chart
ANNEX 2	Updated Policy review report in “MTT Report” series / ANNEX 2 Policy review report updated.
ANNEX 3	Farmer Agreements 2013 / ANNEX 3 Farmer Agreements 2013.
ANNEX 4	IPM Portal process description / ANNEX 4 IPM Portal process description.
ANNEX 5	Report on the process of rotational improvement pest scenarios, monitoring systems and control thresholds /ANNEX 5 Process of rotational improvement pest scenarios, monitoring systems and control thresholds.
ANNEX 6	Strategy on disease resistance management in IPM published / ANNEX 6 Management of fungicide resistance_MTT_Raportti_109
ANNEX 7a	Fungicide resistance poster /ANNEX 7a Fungicideresistance
ANNEX 7b	Herbicide resistance poster / ANNEX 7b Herbicideresistance
ANNEX 7c	Insecticide resistance poster / ANNEX 7c Insecticideresistance
ANNEX 8	Defined benefits and weaknesses of different IPM methods. MTT’s Report no 107 /ANNEX 8 Defined benefits and weaknesses of different IPM methods.
ANNEX 9	Integrated pest management (IPM) in cereal farms – results from PesticideLife project. MTT’s Report no 108 / ANNEX 9 Integrated pest management (IPM) in cereal farms.
ANNEX 10	How to measure the environmental risks from uses of plant protection products for achieving the IPM requirements and risk communication – A case study on the production chain of cereal farming in Finland. MTT’s report no 105 / ANNEX 10 How to measure the environmental risks from uses of PPP.
ANNEX 11	A synthesis report on implementation of IPM and demonstrating the aquatic risks of plant protection products on a Nordic-Baltic scale / ANNEX 11 A synthesis report on implementation of IPM.
ANNEX 12	The 3 rd annual report of the effectiveness of the project actions / ANNEX 12 3rd Annual Report of the Effectiveness of the Project Dec 2013
ANNEX 13	Risk matrix and risk analyses of PesticideLife 2013 / ANNEX 13 Risk matrix and analyses 2013.
ANNEX 14	Selected pictures from PesticideLife web album / ANNEX 14 Selected pictures from PesticideLife web album.
ANNEX 15a	PesticideLife Layman’s Report in Finnish /ANNEX 15 a Layman’s report FI.
ANNEX 15b	PesticideLife Layman’s Report in English / ANNEX 15 b Layman’s report EN.
ANNEX 15c	Pesticidelife Layman’s Report in Swedish / ANNEX 15 c Layman’s report SE.
ANNEX 16	Articles for the press, PesticideLife publications 2010-2013 / ANNEX 16 PesticideLife publications.
ANNEX 17a	Project brochure, last one in Finnish /ANNEX 17a PesticideLife_brochure_FI_2013
ANNEX 17b	Project brochure, last one in English / ANNEX 17b PesticideLife_brochure_EN_2013

ANNEX 17c	Project brochure, last one in Swedish / ANNEX 17c PesticideLife_brochure_SE_2013
ANNEX 18	IPM Videos. Videos are published in <i>Vimeo</i> - web service and linked in PesticideLife's web pages. http://vimeo.com/74633846 , http://vimeo.com/75228700 , http://vimeo.com/77384985
ANNEX 19a	Technical publications on project: proceedings of the national closing seminar in Finnish / ANNEX 19 a Closing seminar proceedings_pdf_FI
ANNEX 19b	Technical publications on project: proceedings of the national closing seminar in English / ANNEX 19 b Closing seminar proceedings_pdf_EN
ANNEX 19c	Technical publications on project: proceedings of the national closing seminar in Swedish / ANNEX 19 c Closing seminar proceedings_pdf_SE
ANNEX 20	Notice boards as poster presentations 2013 / ANNEX 20 notice boards as posters 2013
ANNEX 21a	After Life Communication Plan in Finnish / ANNEX 21a AfterLifeCommunicationPlan_FIN
ANNEX 21b	After Life Communication Plan in English /ANNEX 21b AfterLifeCommunicationPlan_EN
ANNEX 22	Newspaper advertisements during the PesticideLife project 2010-2013 / ANNEX 22 Newspaper advertisements PesticideLife 2010-2013
ANNEX 23	List of presentations of PesticideLife, 154 presentations in total /ANNEX 23 Presentations
ANNEX 24	List of agricultural exhibitions / ANNEX 24 Agricultural exhibitions
ANNEX 25	List of Press hits (in Finnish) / ANNEX 25 Press hits.
ANNEX 26	Standard presentation of PesticideLife project / ANNEX 26 Standard presentation of the project
ANNEX 27	Final table of indicators / ANNEX 27 outcomes_final_tables2010 (1)

7.1 Administrative annexes

Following administrative annexes have been earlier submitted to the Commission. List is indicating in which report/agreement these annexes were forwarded to the Commission.

- IR ANNEX 1 Action 6: Partnership Agreement, in Finnish, 26.05.2010 /ANNEX 1 Partnership Agreement 260510
- Supplementary Agreement No1 to Grant Agreement for project APPENDIX 2, Partnership Agreement 10.06.2011

7.2 Technical annexes

List of key-words and abbreviations

CAP	= Common Agricultural Policy of the European Union
EC	= the European Commission
ENDURE	=The European Network for the Durable Exploitation of Crop Protection Strategies http://www.endure-network.eu/
EnviSense	=Automatic Real-Time Monitoring of the Agri-Environment, Including Nutrient Loading, https://portal.mtt.fi/portal/page/portal/mtt_en/ruralenterprise/tomorrowsfarm/envisense .
FR	= the Final Report, referring to the annexes delivered within the final report e.g. (FR ANNEX 1)
GIS	= Geographic Information System
HAIR	= HARmonized environmental Indicators for pesticide Risk
GPS	= Global Positioning System
IPM	= Integrated Pest Management
IPM-APU	= MTT's project: 'IPM-NAP for horticulture'
IPM WG	= NJF IPM working group
IR	= the Inception Report, sent to the Commission on 25.8.2010; referring to the annexes delivered within the inception report e.g. (IR ANNEX 1)
KSS	= Plant Protection Society of Finland, Kasvinsuojeluseura ry, a stakeholder, www.kasvinsuojeluseura.fi (in Finnish)
MR	= the Mid-term Report, referring to the annexes of the mid-term report e.g. (MR ANNEX 1)
MTT	= MTT Agrifood Research Finland, Coordinating Beneficiary www.mtt.fi
NAP	= National Action Plan on the Sustainable Use of Pesticides
NGO	= Non Governmental Organisation
NJF	= Nordic Association of Agricultural Scientists promoting agricultural research in Nordic-Baltic countries www.njf.nu
NORBARAG	= Nordic-Baltic Resistance Action Group www.mtt.fi/norbarag
NSL	= Nylands Svenska Lantbrukssällskap, Associated Beneficiary, www.nsl.fi
PPP	= Plant Protection Product
PR	= Progress Report, referring to annexes delivered within the progress report e.g. (PR ANNEX 1)
SYKE	= Finnish Environment Institute, Associated Beneficiary in 2010, (replaced by Tukes), www.environment.fi
Tike	= the Information Centre of the Ministry of Agriculture and Forestry, www.mmmmtike.fi
TilaTesti	= Co-operative Group of Agricultural Research, Education and Advice www.virtuaali.info/tilatesti (in Finnish)
Tukes	=Finnish Safety and Chemicals Agency, Associated Beneficiary 2011–2013 (replaced SYKE from the beginning of 2011) www.tukes.fi/en
Usetox	= Scientific consensus model for characterizing human and ecotoxicological impacts of chemicals in life cycle impact assessment.
YLE	=Main TV producer in Finland www.yle.fi
VIPM	=MTT's project: 'IPM Management in vegetable training'
VTT	= Technical Research Centre of Finland www.vtt.fi
WG	= Working Group, referring to the NJF's working groups.

7.3 Dissemination annexes

Dissemination annexes are listed below. The list contains Layman's reports (FI, EN, SE; FR ANNEX 15 a,b,c), After Life Communication Plan (FI, EN; FR ANNEX 20 a,b) and other dissemination annexes. The reference to the certain file or folder in the USB-stick are nominated with ANNEX x.

- Updated Policy review report in "MTT Report" series / ANNEX 2 Policy review report updated.
- Report on the process of rotational improvement pest scenarios, monitoring systems and control thresholds / ANNEX 5 Process of rotational improvement pest scenarios, monitoring systems and control thresholds.
- Strategy on disease resistance management in IPM published / ANNEX 6 Management of fungicide resistance_MTT_Raportti_109
- Fungicide resistance poster / ANNEX 7a Fungicideresistance
- Herbicide resistance poster / ANNEX 7b Herbicideresistance
- Insecticide resistance poster / ANNEX 7c Insecticideresistance
- Defined benefits and weaknesses of different IPM methods. MTT's Report no 107 / ANNEX 8 Defined benefits and weaknesses of different IPM methods.
- Integrated pest management (IPM) in cereal farms – results from PesticideLife project. MTT's Report no 108 / ANNEX 9 Integrated pest management (IPM) in cereal farms.
- How to measure the environmental risks from uses of plant protection products for achieving the IPM requirements and risk communication – A case study on the production chain of cereal farming in Finland. MTT's report no 105 / ANNEX 10 How to measure the environmental risks from uses of PPP.
- A synthesis report on implementation of IPM and demonstrating the aquatic risks of plant protection products on a Nordic-Baltic scale / ANNEX 11 A synthesis report on implementation of IPM.
- Selected pictures from PesticideLife web album. The total number of photographs in PesticideLife web album is over 2000. <http://picasaweb.google.com/112009986095518455101> / ANNEX 14 Selected pictures from PesticideLife web album.
- PesticideLife Layman's Report in Finnish / ANNEX 15 a Layman's report FI.
- PesticideLife Layman's Report in English / ANNEX 15 b Layman's report EN.
- PesticideLife Layman's Report in Swedish / ANNEX 15 c Layman's report SE.
- Articles for the press, PesticideLife publications 2010-2013 /ANNEX 16 PesticideLife publications.
- Project brochure, last one in Finnish / ANNEX 17a PesticideLife_brochure_FI_2013
- Project brochure, last one in English / ANNEX 17b PesticideLife_brochure_EN_2013
- Project brochure, last one in Swedish / ANNEX 17c PesticideLife_brochure_SE_2013
- IPM Videos. ANNEX 18. Videos are published in *Vimeo* –web service and linked in PesticideLife's web pages. <http://vimeo.com/74633846>, <http://vimeo.com/75228700>, <http://vimeo.com/77384985>
- Technical publications on project: proceedings of the national closing seminar in Finnish /ANNEX 19 a Closing seminar proceedings_pdf_FI
- Technical publications on project: proceedings of the national closing seminar in English / ANNEX 19 b Closing seminar proceedings_pdf_EN
- Technical publications on project: proceedings of the national closing seminar in Swedish / ANNEX 19 c Closing seminar proceedings_pdf_SE
- Notice boards as poster presentations 2013 /ANNEX 20 notice boards as posters 2013
- After Life Communication Plan in Finnish / ANNEX 21a AfterLifeCommunicationPlan_FIN
- After Life Communication Plan in English / ANNEX 21b AfterLifeCommunicationPlan_EN
- Newspaper advertisements during the PesticideLife project 2010-2013 / ANNEX 22 Newspaper advertisements PesticideLife 2010-2013
- List of presentations of PesticideLife, 154 presentations in total / ANNEX 23 Presentations

- List of agricultural exhibitions /ANNEX 24 Agricultural exhibitions
- List of Press hits (in Finnish) / ANNEX 25 Press hits.
- Standard presentation of PesticideLife project / ANNEX 26 Standard presentation of the project.

7.4 Final table of indicators

Document Outcomes (FR ANNEX 27) shows the outcomes of PesticideLife. The part 3 Awareness raising and Communication, Table 4, illustrates the number and size of the different events where project and its results were presented.

7.5 Annexes of the earlier reports

Table 15. Annexes of the earlier reports. These annexes have already been delivered to the Commission. The following codes are used for indicating in which report the documents/files are forwarded to the commission: IR= Inception Report, MR= Mid Term Report, PR= Progress Report

IR ANNEX 1	Action 6: Partnership Agreement, in Finnish. ANNEX 1 Partnership Agreement 260510.pdf
IR ANNEX 2	Action 1: Policy review report. In Finnish with English and Swedish summaries. ANNEX 2 Policy Review 300510.pdf.
IR ANNEX 3	Action 1: Realisation of PesticideLife Plans - IPM tools. Teamwork using Delphi method by Marja Jalli. ANNEX 3 Realisation of PesticideLife plans.pdf.
IR ANNEX 4	Action 2: Pest Control Thresholds – A review. In Finnish with summary in English. ANNEX 4 Pest Control Thresholds.pdf.
IR ANNEX 5a	Action 5: Notice Boards. NB´s are presented with a Finnish, a translated English and a Swedish version. ANNEX 5a Notice Boards FI SE EN.pdf.
IR ANNEX 5b	Action 5: Notice Boards at the organised field days. This NB is presented with a Finnish and a translated English version. ANNEX 5b Notice Boards at field days FI EN.pdf.
IR ANNEX 5c	Action 5: Notice Boards as posters at the agricultural exhibitions and seminars. NB´s are presented with a Finnish, a Swedish and a translated English version. ANNEX 5c Notice Board poster at seminars etc.pdf.
IR ANNEX 6a	Action 5: Project brochure in English. ANNEX 6a PesticideLife brochure EN.pdf.
IR ANNEX 6b	Action 5: Project brochure in Finnish. ANNEX 6b PesticideLife brochure FI.pdf.
IR ANNEX 6c	Action 5: Project brochure in Swedish. ANNEX 6c PesticideLife brochure SE.pdf.
IR ANNEX 7	Action 5: Visitor guides. VG´s are exemplified with a Finnish, a Swedish and a translated English version. ANNEX 7 Visitor guides exemplified FI SE EN.pdf.
IR ANNEX 8a	Action 5: Proceedings of the Opening Seminar, in Finnish. Folder ANNEX 8a Proceedings of the Opening Seminar, FI.
IR ANNEX 8b	Action 5: Proceedings of the Opening Seminar, translated in English. Folder ANNEX 8b Proceedings of the Opening Seminar, EN.
IR ANNEX 9	Action 6: Project schedule for management and monitoring purposes, in English. ANNEX 9 Project schedule.pdf
IR ANNEX 10	Action 7: Internal Monitoring Report, in English. ANNEX 10 Internal Monitoring Report 29042010.pdf.
MR ANNEX 1	Farmer Agreements (8 pcs, in Finnish) / ANNEX 1 Farmer agreements
MR ANNEX 2	Updated policy review report in series "MTT Raportti" / ANNEX 2 Policy review second version.pdf
MR ANNEX 3	List of presentations of the project and amount of participants / ANNEX 3 Presentations and participants.pdf

MR ANNEX 4	List of exhibitions, where the project has been presented, and amount of participants / ANNEX 4 Exhibitions and participants.pdf
MR ANNEX 5	First round of test and demonstrations reported and first round of back-casting (3 years) reported (2010) / ANNEX 5 First report on demonstrations and tests FI EN.pdf
MR ANNEX 6	2nd round scenarios of the upcoming PP needs compiled and reported 2nd round of control threshold reported (2011) / ANNEX 6 scenarios of PP needs and control thresholds.pdf
MR ANNEX 7	Visitor guides exemplified for demonstration sites (2011) / ANNEX 7 Visitor guides exemplified FI.pdf
MR ANNEX 8a	Notice boards – up to 120 items – second ones (2011) 26 pcs erected to the fields / ANNEX 8a Notice Board FI SE EN.pdf
MR ANNEX 8b	Notice boards – up to 120 items – second ones (2011) 8 pcs presented on field days / ANNEX 8b Notice boards as posters on field days.pdf
MR ANNEX 8c	Notice boards – up to 120 items – second ones (2011) 7 pcs presented on other agricultural events / ANNEX 8c Notice boards as poster on other events.pdf
MR ANNEX 9a	Second project brochure (FI) / ANNEX 9a 2nd project brochure FI.pdf
MR ANNEX 9b	Second project brochure (EN) / ANNEX 9b 2nd project brochure EN.pdf
MR ANNEX 9c	Second project brochure (SE) / ANNEX 9c 2nd project brochure SE.pdf
MR ANNEX 9d	Additional project brochure (FI) / ANNEX 9d additional project brochure1.pdf
MR ANNEX 9e	Additional project brochure (FI) / ANNEX 9e additional project brochure2.pdf
MR ANNEX 10	Proceedings of the international mid-term seminar in Ultuna, Sweden / ANNEX 10 International mid-term seminar EN.pdf
MR ANNEX 11a	Proceedings of the national mid-term seminar Ilmajoki, Finland (FI) / ANNEX 11a Proceedings of the National mid-term seminar FI.pdf
MR ANNEX 11b	Proceedings of the national mid-term seminar Ilmajoki, Finland (EN) / ANNEX 11b Proceedings of the National mid-term seminar EN.pdf
MR ANNEX 11c	Proceedings of the national mid-term seminar Ilmajoki, Finland (SE) / ANNEX 11c Proceedings of the National mid-term seminar SE.pdf
MR ANNEX 12a	List of publications / ANNEX 12a List of publications.pdf
MR ANNEX 12b	Press hits / ANNEX 12b press hits.pdf
MR ANNEX 13	Project schedule / ANNEX 13 Project schedule.pdf
MR ANNEX 14	A report of self-assessment of the viability of the project / ANNEX 14 Self assessment of the viability of the project.pdf
MR ANNEX 15	The 1 st annual report of the effectiveness of the project actions / ANNEX 15 1st annual report of the project effectiveness.pdf
MR ANNEX 16	VAT declaration of MTT / VAT declaration of MTT.pdf
PR ANNEX 1	Farmer Agreements (19 pcs, in Finnish) / ANNEX 1 Farmer agreements
PR ANNEX 2	Presentations of the project and amount of participants / ANNEX 2 Presentations and participants.pdf
PR ANNEX 3	Exhibitions, where the project has been presented, and amount of participants / ANNEX 3 Exhibitions and participants.pdf
PR ANNEX 4	2nd round of test and demonstrations reported and 2nd round of back-casting reported (2011) / ANNEX 4 2nd round of tests and demonstrations FI EN.pdf
PR ANNEX 5	Final round scenarios of the upcoming PP needs compiled and reported final round of control threshold reported (2012) / ANNEX 5 Final scenarios of PP needs and control thresholds.pdf
PR ANNEX 6	Final round of test and demonstrations reported and final round of back-casting reported (2012) / ANNEX 6 Final report on demonstrations and tests FI EN.pdf
PR ANNEX 7	Visitor guides exemplified for demonstration sites (2012) / ANNEX 7 Visitor guides exemplified fi se en 2012.pdf
PR ANNEX 8a	Notice boards – up to 120 items – final ones (2012) 26 pcs erected to the fields / ANNEX 8a Noticeboard FI SE EN.pdf
PR ANNEX 8b	Notice boards – up to 120 items – final ones (2012) 6 pcs presented on field days including rollup poster / ANNEX 8b Notice boards as posters on field days FI SE.pdf
PR ANNEX 8c	Notice boards – up to 120 items – final ones (2012) 7 pcs presented on other agricultural

	events / ANNEX 8c Notice boards as poster on other events FI EN.pdf
PR ANNEX 9a	Proceedings of the international closing seminar in Tallinn, Estonia / ANNEX 9a International closing seminar EN.pdf
PR ANNEX 9b	Summary of international closing seminar in Tallinn, Estonia, compiled by Kari Tiilikkala for NJF administration / ANNEX 9b Summary of international closing seminar EN.pdf
PR ANNEX 9c	Poster presented in closing seminar / ANNEX 9c Noticeboard as poster on closing seminar EN.pdf
PR ANNEX 10a	List of publications /ANNEX 10a List of publications.pdf
PR ANNEX 10b	Press hits /ANNEX 10b press hits.pdf
PR ANNEX 11	Project schedule / ANNEX 11 Project schedule.pdf
PR ANNEX 12	Risk analyse and matrix of past and current project risks compiled by project expert / ANNEX 12 Risk assessment and matrix.pdf
PR ANNEX 13	The 2nd annual report of the effectiveness of the project actions / ANNEX 13 2nd annual report of the project effectiveness.pdf
PR ANNEX 14	Covering letter
PR ANNEX 15	Feedback letter of MR from EU commission received in May 2012 / ANNEX 15 Feedback letter from EU Commission.pdf
PR ANNEX 16	Report on process description and success of farm IPM demonstrations / ANNEX 16 Report on process description and success of farm IPM demonstrations.pdf
PR ANNEX 17	Report on defined benefits and weaknesses of different IPM methods / ANNEX 17 Defined benefits and weaknesses of different IPM methods.pdf
PR ANNEX 18	Table of attendance to other events than field days / ANNEX 18 Attendance to other events.pdf
PR ANNEX 19	Deliverables completed so far / ANNEX 19 Deliverables completed so far.pdf

8 Financial report and annexes

Financial report covers the PesticideLife projects activities between 1.1.2010-31.12.2013. The report consists of Excel files and annexes, which are listed below. For more information, please see FR Part 6, page 53, Comments on the financial report.

Table 16 Annexes of the financial report

ANNEX 28	List of international travels and cost /ANNEX 28 International travels and costs
ANNEX 29	Template for counting the evidence of 2% rule / ANNEX 29 PesticideLife 2% rule
ANNEX 30	Independent audit report. / ANNEX 30 Independent_audit_report_PesticideLife