

# ARGUMENTS

## Introduction:

Integrated Pest Management (IPM) is a sustainable approach to manage pests that combines biological, cultural, physical and chemical tools in a way that minimizes economic, health, and environmental risks. It relies on technical solutions to manage weeds, pests and diseases but also takes social, economic and environmental factors into account. In this way, IPM contributes to the three pillars of sustainable development in agriculture.

Regarding social aspects and from the point of view of farmers, IPM can improve **farmer image** and is an opportunity to respond to demands for reduced health and environmental risks associated with pesticides. It can also help farmers **anticipate change**. By investing today in IPM, farmers will be better prepared for the requirements of tomorrow. IPM farms will be less affected by **new constraints** affecting buffer zones, re-entry periods, authorised wind speed, reduced dosages, banned pesticides, as well as the evolution of resistance to pesticides.

For advisors, IPM is an opportunity to renew their professional priorities, embrace the new demands for sustainable development and change the way they think about crop protection. IPM is learning intensive because it is not a fixed set of practices to be mechanically repeated every year. Rather, it is a way of tackling problems that integrates agronomic, ecological, biological and technological knowledge into crop protection strategies. The resulting insights and approaches can be shared with farmers. In this way, advisors and consultants can offer new **services to farmers** such as the use of Decision Support Systems and other IPM tools, or with IPM-related training, or with general advice on how to meet consumer and environmental requirements, for example.

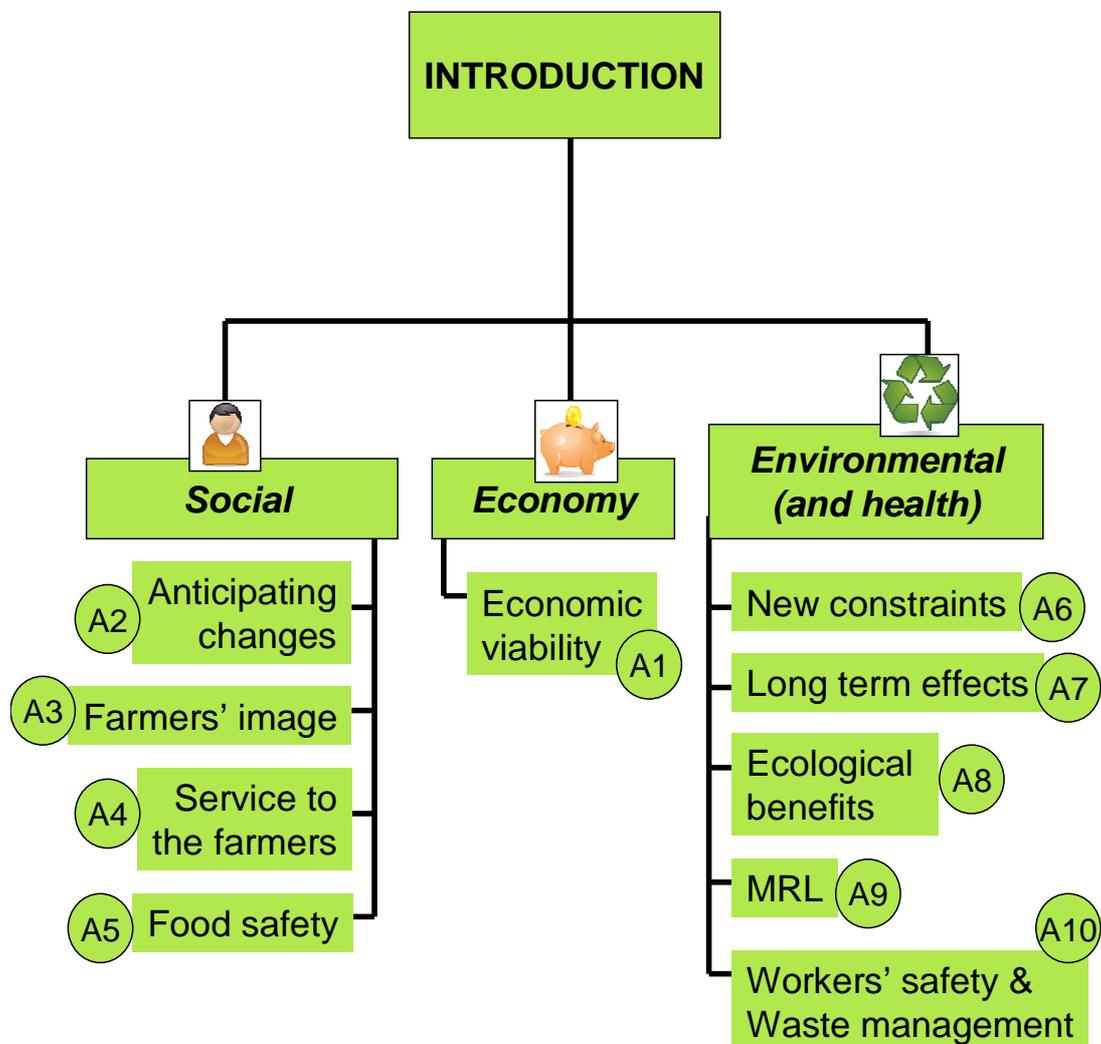
Over the short-term, IPM can generate benefits when attention is placed on optimising treatments and giving preference to tactics that have the least negative impact. Over the **long-term effects**, IPM generates a variety of benefits. Within cultivated fields, IPM can generate an *eco-regulated system* where more stable populations of beneficials can regulate pests and minimise outbreaks. By giving priority to preventive measures, more stable farming systems that are inherently less vulnerable to pests and less reliant on pesticides are favoured. This can reduce economic as well as technical dependence on pesticides. In fact, over the long term, the **economic viability** of IPM has been shown. Some of the economic benefits come from reduced pesticide volumes and treatments, higher quality of production and fewer residue problems in food, feed, and ground and surface water. Beyond the fields, IPM can minimize

impacts on water and non-target flora and fauna, decrease drift, run-off and leaching. And finally, IPM also improves **worker safety** by reducing exposure and **food** by ensuring that **Maximum Residues Levels** are not exceeded.

The set of "argument sheets" in this training guide offer ideas for advisors on how to use the above arguments to better engage farmers in a learning process around IPM.



# Arguments section



|   |                             |
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| Argument  | <h1>Economic viability</h1> |
| A1  |                             |
|  | <h2>Economy</h2>            |

Date (12/08/2010)

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| <b>WHAT IS</b> | <p>Farmers are often keen to talk about rationalising their practices and about their economic expectations.</p> <p>Their first rationale to reduce the use of pesticides is usually to save on costs. Consequently, incentives and regulations and/or strong environmental motivation are necessary to ensure continued use of IPM, especially when crop prices rise and returns on yield are higher.</p>  |
| <b>WHY</b>     | <p>Expected yield losses, costs of current/advanced/innovative strategies and the ability of current/advanced/innovative strategies to reduce yield losses are crucial to the farmer for balancing expected yield risks and costs of control strategies. With the use of IPM techniques, for example preventive measures, Decision Support Systems, monitoring and optimised dosage of products, the importance of the cost of innovative strategies could be reduced. Secondly, the increase in cost of chemical crop protection, due to the withdrawal of several old and cheaper pesticides, is another key point for on-farm economics and for implementing innovative strategies focusing on lower pesticide inputs.</p> |
| <b>HOW</b>     | <p>The comparison of different crop protection systems must be wisely evaluated with relevant factors. In ENDURE, three main topics with different factors were used:</p> <ol style="list-style-type: none"> <li><b>1. Profitability:</b> Represented by the family income per labour hour, the total production cost and finally the net profit per hectare.</li> <li><b>2. Autonomy:</b> Represented by the invested capital per hectare and the return on investment per hectare.</li> <li><b>3. Economic risk:</b> Represented by the income variability and the probability of dramatic yield loss.</li> </ol> <p>The final result of this evaluation must not be less than 'similar' to a conventional system.</p>      |
| <b>SOURCES</b> | <p>You can find some relevant information in the following documents:</p> <p><b>ENDURE sustainability assessment:</b><br/> <a href="http://www.endure-network.eu/about_endure/all_the_news/assessing_sustainability_of_new_strategies">http://www.endure-network.eu/about_endure/all_the_news/assessing_sustainability_of_new_strategies</a></p> <p>This article provides access to a paper providing an example in</p>   |

orchards: *A multicriteria decision method assessing the overall sustainability of new crop protection strategies: the case of apple growing in Europe.*

**ENDURE Deliverables:**

[http://www.endure-network.eu/endure\\_publications/deliverables](http://www.endure-network.eu/endure_publications/deliverables)

- Preliminary list of potential criteria for assessing sustainability of crop protection strategies (DR 2.1)
- Report on socio-economic driving forces of different plant protection strategies in pomefruit production in four EU-regions (DR 3.8)

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| <b>ARGUMENTS</b><br><br>A 2   | <h1>Anticipating change</h1> |
|  | <h2>Social</h2>              |

Date (15/03/2010)

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| <b>WHAT IS</b> | <p>'Anticipating change' refers to a pro-active attitude towards trying out and adopting new ways of doing things. In this case, it is about farmers trying out, adapting and adopting the practice of IPM before it becomes mandatory in 2014, as required by the new EU Framework Directive.</p> <p>Farmers adopt a variety of attitudes towards change. Some resist it. Some go with the flow. Many adjust current practices or even test completely new ones. Among the latter, some are more influential and actually become drivers of change in the local farming community. But innovating is risky. What is it that farmers gain by taking on the extra risk associated with new not-so-well tested practices? Surely, those that choose to drive change gain something that counterbalances the extra risk taken? And those who do not innovate, maybe they have good reasons to keep out of uncharted waters?</p>  |
| <b>WHY</b>     | <p>Talking about the advantages of adopting a pro-active attitude can motivate farmers to test IPM. Learning about examples of farmers who have gained something from their anticipation of change can become a source of inspiration for other farmers.</p> <p>Addressing the reasons behind risk aversion can help to identify barriers to IPM implementation and adjust training accordingly. If the barriers are technical, then the advice needs to be technically convincing. If the barriers are not technical, talking about the non-technical aspects is helpful. It may lead to identifying solutions. Advisers should not pretend that a particular IPM practice that is technically efficient against a pest is the unquestionable solution if it is obvious that factors such as availability of time, labour or equipment, or buyer and consumer requirements, come into play. Acknowledging non-technical barriers will make advisers more credible.</p> |
| <b>HOW</b>     | <p>Take some time to talk about this issue. Come to your group with real-life examples of successful innovations and of the various types of barriers to innovation. Encourage your audience to say how they feel about new practices, what their past experience has been and whether they feel completely free to change or adjust their current practices. For this, you can use the <b>brainstorming</b>, <b>hum group</b> or <b>post-it</b> methodologies (see methodology sheets).</p>  |

**SOURCES**

Two ENDURE leaflets available at [http://www.endure-network.eu/endure\\_publications/endure\\_publications2](http://www.endure-network.eu/endure_publications/endure_publications2)

- The conditions of transition towards Integrated Pest Management (IPM) practices. Social Science Insights on Crop Protection. Claire Lamine *et al.* 2009.
- Are supermarket schemes a tool for implementing Integrated Pest Management (IPM)? Social Science Insights on Crop Protection. Isabelle Haynes *et al.* 2009.

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| Argument<br><br>A 3   | <h1>Farmer image</h1> |
|  | <h2>Social</h2>       |

Date (01/02/2010)

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| <b>WHAT IS</b> | <p>'Farmer image' is the mental representation that non-farmers have of farmers. Here we are emphasising the difference between the image farmers would like to project and the image they believe they actually have. It is one aspect of the social pressure placed on farmers and contributes to the social identity of the profession.</p>  |
| <b>WHY</b>     | <p>Most farmers are proud of their profession, and have invested in innovative and pro-environment approaches. However, they often feel that their efforts are not recognised and that the negative aspects of conventional agriculture are over-emphasised. Engaging farmers in a discussion on how they are perceived is an excellent way of introducing them to the idea that IPM can help them improve that image and gain positive recognition.</p>  |
| <b>HOW</b>     | <p>Invite farmers to discuss their image by asking them about:</p> <ul style="list-style-type: none"> <li>▶ Today's image of farmers in society.</li> <li>▶ The image that they would like to project.</li> <li>▶ Anecdotes involving family, neighbours, friends, school, media....</li> </ul> <p>Then, steer the discussion onto environmentally friendly practices or specifically IPM and how they can improve farmer image, for example, among the farming community through the recognition of IPM in legislation, among the retail industry due to the visibility of some IPM practices, or by using IPM when communicating with the public.</p> <p>Draw on the following ideas and use information pertinent to your own context to support your point (examples are given in each topic):</p> <ul style="list-style-type: none"> <li>▶ Non-farmers are interested in farmers: Every year, the International Agricultural Fair in Paris attracts increasing numbers of visitors (670 000 in 2009, two-thirds of whom have no connection to farming).</li> <li>▶ Farmers invest time and money into improving their image: The UK farmer organisation LEAF has a large programme devoted to restoring public confidence in the farming industry with Open Farm Sundays and self-help tools to prepare farmers for public speaking.</li> <li>▶ Farmers are sensitive to social pressure: A survey of 205</li> </ul> |

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|                | arable crop farmers in France conducted by social psychologists showed that, even though economic and environmental considerations matter very much to farmers, it is improving their public image which most strongly determines their commitment to pro-environmental action. |
| <b>SOURCES</b> | Linking Environment And Farming. <a href="http://www.leafuk.org">www.leafuk.org</a><br>Michel-Guillou, E & Moser, G. 2006. Commitment of farmers to environmental protection: From social pressure to environmental conscience. J. Environmental Psychology 26(3): 227-235.     |

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| Argument<br><br>A 4   | <h1>Services to farmers</h1> |
|  | <h2>Social</h2>              |

Date (26/03/2010)

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| <b>WHAT IS</b> | <p>To maintain profitability and run a sustainable farm under an IPM regime requires a high level of professional knowledge from farmers. Some farmers are able to adapt to this kind of challenge with few problems, while others benefit from competent sparring with professionals.</p> <p>Advisers need to develop services for this latter group of farmers. These services should of course follow the general IPM principles: prevention, monitoring, decision making, non-chemical methods, target-specific selection and use of pesticides, non-resistance strategies and records of practice.</p>   |
| <b>WHY</b>     | <p>Changing farming systems towards IPM requires specialised knowledge but in most cases the adoption of innovative technologies by farmers is rather slow. Obtaining some tools from advisers ensures that it is possible to run a sustainable and profitable farm. Training, and especially season-long training, is one of the best services to set up with farmers.</p>   |
| <b>HOW</b>     | <p>In order to meet the demands of IPM farmers, the organisation (whether it be an advisory service, extension service, cooperative or similar) has to develop a wide range of services. The services may be composed of:</p> <ul style="list-style-type: none"> <li>▶ <u>Information</u> (modern media and communication systems): about specific or general methods.</li> <li>▶ <u>In-field advice</u>: Profit is not made at a desk or in the training room, so make sure that the services developed are able to support farmers during the growing season, either as personal advice and/or as season-specific information material.</li> <li>▶ <u>Training</u>: About general IPM principles or crop-specific problems. The ENDURE IPM training guide is built to provide <b>arguments</b>, <b>methodologies</b> and <b>tools</b> to be used in a training session or training course (see guide sheets). The <b>modules</b> developed by ENDURE (see contents sheets) are some concrete examples on how IPM has been implemented in various crops, countries etc., these may either be used as they are or adapted to the local context.</li> <li>▶ <u>Tools</u>: several tools (see tools sheets) have been developed to support farmers achieve a better implementation of IPM practices (e.g. <a href="#">ENDURE Information Centre</a>, <a href="#">EuroWheat</a>, <a href="#">EuroBlight</a>).</li> </ul> |

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|                | Finally, remember that farmers have to be able to see the added value of using money on professional advice.   |
| <b>SOURCES</b> | <p>More relevant information can be found in the following documents:</p> <p>ENDURE's definition of IPM<br/><a href="http://www.endure-network.eu/about_crop_protection/endure_s_definition_of_ipm">http://www.endure-network.eu/about_crop_protection/endure_s_definition_of_ipm</a></p> <p>Development of guidance Document for establishing IPM principles (BiPRO, JKI)<br/><a href="http://www.endure-network.eu/about_crop_protection/european_documents">http://www.endure-network.eu/about_crop_protection/european_documents</a></p> <p>Report on the BiPRO study submitted by ENDURE network of experts for DG environment<br/><a href="http://www.endure-network.eu/about_crop_protection/endure_position_papers">http://www.endure-network.eu/about_crop_protection/endure_position_papers</a></p> <p>Integrated plant protection in the context of a sustainable agriculture</p> <p>IOBC/wprs Bull. 21 (1) 1998:<br/><a href="http://www.iobc-wprs.org/ip_ipm/01_IOBC_Principles_and_Tech_Guidelines_2004.pdf">http://www.iobc-wprs.org/ip_ipm/01_IOBC_Principles_and_Tech_Guidelines_2004.pdf</a></p> |

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| Argument  | <h1>Food safety</h1> |
| A5  |                      |
|  | Social               |

Date (17/08/2010)

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| <b>WHAT IS</b> | <p>Food safety is a scientific discipline describing cultivation, handling, preparation and storage of food commodities and food in such a way as to prevent contamination and foodborne illnesses. Food contamination can occur in all kinds of food commodities (plant, animal, seafood etc.). In plant food commodities, plant pathogens and their products (such as mycotoxins caused by <i>Fusarium</i> spp) and pesticide residues above Maximum Residue Levels are the contaminations which may impair human health.</p> <p>The European Union (EU) is taking a broader view of what food safety is. Rather than concentrating only on contamination, EU authorities are now extending the scope of their checks to look more systematically at whether products comply with consumer information requirements and with the rules on what foodstuffs may or may not contain. Thus the EU's strategy for food safety is to follow food from the place where it was produced through to the place of consumption, in other words <b>'from farm to fork'</b>. In the EU, the European Food Safety Authority (EFSA) is the keystone for risk assessment regarding food and feed safety.</p> |
| <b>WHY</b>     | <p>Consumers in the EU want to eat high quality food that is uncontaminated by inappropriate treatment during cultivation, storage or subsequent processing. This expectation from consumers is supported by General Food Law (Regulation (EC) No 178/2002), which imposes general obligations to provide safe food for consumers.</p> <p>Integrated Production (IP) is a farming system which secures sustainable production of high quality food and other products through ecologically preferable and safe technologies. Integrated Production aims to produce high quality agricultural products mainly through ecologically sound techniques. The EU supports production of high quality food, including IP. This approach is seen as the best means of combining a number of objectives:</p> <ul style="list-style-type: none"> <li>▶ Reasonable incomes for farmers</li> <li>▶ Fair prices and safe food of high quality for consumers</li> <li>▶ An acceptable cost to the taxpayer</li> <li>▶ Allowing other countries fair access to EU markets for their produce and food</li> <li>▶ A competitive food industry.</li> </ul>   |

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|                | <p>Integrated Pest Management is also in line with the above objectives. Since food, food ingredients and feed labels must indicate all essential information on the composition of the product, the manufacturer, methods of storage and preparation, products are carefully tracked from farm to fork. This is also an issue: why it is essential for farmers to produce high quality food.</p>  |
| <b>HOW</b>     | <p>In the EU there is a comprehensive set of standards regarding food safety. Legislation regarding food safety 'General Food Law' was set up in 2002. You can work on this law with participants (methodology sheets <b>Info hunt</b> or <b>Highlight hierarchy</b> could be the right method trainees need to explore the text). This law:</p> <ul style="list-style-type: none"> <li>▶ Sets out the principles applying to food safety</li> <li>▶ Introduced the concept of 'traceability', which means that foodstuffs, animal feed and feed ingredients can be traced right through the food chain, from farm to fork. This is a so called 'one step back and one step forward' approach</li> <li>▶ Set up the European Food Safety Authority (EFSA) to bring under one roof the work previously done by a range of scientific committees and to make the scientific risk assessment process more public</li> <li>▶ Reinforced the rapid alert system (RASFF). RASFF is used to act quickly in the event of a food and/or feed safety care.</li> </ul>  |
| <b>SOURCES</b> | <p>Relevant information about food safety can be found from the following sources:</p> <p><a href="#">Satin, M., Food Alert: The Ultimate Sourcebook for Food Safety, Facts on File, Inc., September 2008, 2nd ed.</a><br/> <a href="http://ec.europa.eu/publications/booklets/move/46/en.pdf">http://ec.europa.eu/publications/booklets/move/46/en.pdf</a><br/> <a href="http://www.efsa.europa.eu/">http://www.efsa.europa.eu/</a><br/> <a href="http://www.efma.org/PRODUCT%20STEWARDSHIP%20PROGRAM%2008/images/EXPLAINING%20INTEGRATED%20FARMING-final.doc">http://www.efma.org/PRODUCT%20STEWARDSHIP%20PROGRAM%2008/images/EXPLAINING%20INTEGRATED%20FARMING-final.doc</a><br/> <a href="http://www.who.int/foodsafety/fs_management/en/">http://www.who.int/foodsafety/fs_management/en/</a><br/> <a href="http://www.iobc-wprs.org/ipm/01_IOBC_Principles_and_Tech_Guidelines_2004.pdf">http://www.iobc-wprs.org/ipm/01_IOBC_Principles_and_Tech_Guidelines_2004.pdf</a><br/> <a href="http://www.foodallergens.info/Legal/General/General.html">http://www.foodallergens.info/Legal/General/General.html</a></p> |

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| Argument<br><br>A 6   | <h1 style="margin: 0;">New legal constraints on<br/>pesticide use and the<br/>potential of IPM</h1> |
|  | <h2 style="margin: 0;">Environmental</h2>   |

Date (11/05/2010)

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| <b>WHAT IS</b> | <p>Pesticides have been designed to control living organisms, such as weeds, plant diseases and pests, and most active substances in pesticides are hazardous. Use of pesticides therefore involves risks to those who apply them, to those who consume treated produce and the environment. Both European and national regulations set up a number of provisions in the use of pesticides to mitigate these risks.</p> <p>Integrated Pest Management (IPM) is an alternative which minimises the risks to human health and the environment. While IPM may entail time management and technical constraints, it will nevertheless buffer regulatory constraints such as the possible reduced availability of pesticides and help prevent the development of resistance problems.</p>  |
| <b>WHY</b>     | <p>IPM, which involves the application of cultural and preventive measures and the use of pesticides in a more targeted fashion, reduces strongly the constraints introduced by the regulations (less use of products → fewer risks).</p> <p>From a resistance perspective, IPM also allows for better control of pests, diseases and weeds because it involves techniques rather than products.</p> <p>In fact, all technical and regulatory measures significantly reduce flexibility in the use of pesticides and also limit the argument which claims that IPM is complicated and time consuming. The main arguments to put forward are:</p> <ul style="list-style-type: none"> <li>▶ IPM is a system whereby farmers make decisions. Their decisions depend on the information they have as well as their confidence to take action.</li> <li>▶ Farmers learn about IPM through observation and experimentation.</li> <li>▶ IPM principles are realistic when farmers learn by doing</li> <li>▶ IPM is an enhancing system for farmers.</li> </ul> |
| <b>HOW</b>     | <p>First, ask a group of farmers to present all the constraints they can think of when using pesticides. For this, you can use the <b>brainstorming</b>, <b>hum group</b> or <b>post-it</b> methodologies (see methodology sheets).</p>   |

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|                       | <p>Second, work with them to estimate the costs, both economic and in terms of time, that these constraints represent, and to set up good practices in terms of the quantity of pesticides used.</p> <p>Third, try to find alternative solutions with a focus on cultural methods and prevention before actual pesticide use. Discuss the advantages and disadvantages of the possible solutions. You can estimate the economic and time costs of the options and then identify good practice.</p> <p>Finally develop the positive aspects and indirect effects (not forgetting the long-term approach) of IPM implementation on a farm with regard to the previously discussed options. For this final step, you can use the <b>restitution</b> method (see methodology sheet).</p> |
| <p><b>SOURCES</b></p> | <p>You can find relevant information in the following documents:</p> <p>Directive establishing a framework for Community action to achieve the sustainable use of pesticides<br/> <a href="http://www.endure-network.eu/about_crop_protection/european_documents">http://www.endure-network.eu/about_crop_protection/european_documents</a></p> <p>National policy documents (National programmes EU, DK, FR, NL, UK &amp; National action plans : DK, FR, DE,<br/> <a href="http://www.endure-network.eu/about_crop_protection/national_policy_documents">http://www.endure-network.eu/about_crop_protection/national_policy_documents</a></p>  |

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| <b>ARGUMENT</b><br><br>A7   | <h2>Long-term effects</h2> |
|  | <b>Environmental</b>       |

Date (22/04/2010)

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| <b>WHAT IS...</b> | <p>During the growing season, farmers make quick decisions to reduce risks associated with the presence of pests. In urgent situations, chemical control is convenient and efficient. Nevertheless, its quick action should not hide long-term consequences such as resistance, the gradual elimination of beneficials and environmental and health impacts.</p> <p>Even though there are urgent and important situations that call for rapid action, farmers also make decisions of the slower type: regarding choice of crops and varieties, investment in heavy equipment, or marketing strategies. Whereas the decision to spray or not to spray a chemical, and the expected result of such decisions, can be extremely short-term, the process of switching to IPM and fully benefiting from it is slower. IPM therefore needs to find its place in the long-term strategic thinking of farmers.</p> <p>IPM, as any knowledge-intensive technology, requires much learning and problem solving in the beginning though much less once the solutions are developed. The net returns from a transition to IPM will increase more rapidly if farmers are part of a dynamic network that will more quickly circulate valuable site-specific information on these solutions.</p> <p>IPM is also more closely connected to natural processes. Some of these processes, such as the build-up of beneficials, can in some cases take a long time. In Canada, for example, a study on apples found that the maximum effect of beneficials against apple maggot (obtaining 91% clean fruit without insecticides) was attained only after five years. The persistence of seed-banks makes weed management a multi-year question. That's why ENDURE recommends that farmers reducing their reliance on herbicides consider cover cropping and diversifying their rotations.</p> |
| <b>WHY</b>        | <p>The benefits of chemical crop protection are short term but their drawbacks tend to become apparent over the longer term. Conversely, the drawbacks of IPM are more significant in the initial stages of transition and their advantages appear in</p>   |

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|                | <p>the longer term.</p> <p>It is important to talk about short term versus long term so that IPM can be included in the long-term strategic thinking of farmers. Because switching to IPM is challenging in the initial stages, farmers and advisers need to devise locally adapted solutions to overcome short-term drawbacks.</p>  |
| <b>HOW</b>     | <p>Take some time to talk about this issue with farmers. Come to your group with real-life illustrations of the short-term/long-term issue. Encourage your audience to give their opinion and share their experience and explore solutions.</p>  |
| <b>SOURCES</b> | <ul style="list-style-type: none"> <li>▶ <a href="#">ENDURE</a> Integrated Weed Management Case Study Guide 1.</li> <li>▶ <a href="#">Bostanian NJ</a>, <a href="#">Goulet H</a>, <a href="#">O'Hara J</a>, <a href="#">Masner L</a>, <a href="#">Racette G</a>. 2004. Towards insecticide free apple orchards: Flowering plants to attract beneficial arthropods. <i>BIOCONTROL SCIENCE AND TECHNOLOGY</i>, 14 :25-37.</li> </ul> |

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| Argument<br><br>A8  | <h1>Environmental benefits<br/>of IPM</h1> |
|  | Environmental                              |

Date (03/11/2010)

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| <b>WHAT IS</b> | <p>The implementation of IPM has positive effects on the environment, mainly linked to the importance assigned in IPM to ecological infrastructures, which are not only protected, but actively planted and maintained, to the reduced use of pesticides and to the use of more specific and selective pest control measures. The most important environmental benefits of IPM are:</p> <ul style="list-style-type: none"> <li>▶ The reduction of the environmental risks associated to the use of pesticides, which include air, soil and surface and ground water pollution.</li> <li>▶ The increase in the diversity of the fauna related to pest control (natural enemies).</li> <li>▶ The increase in the diversity of general fauna.</li> </ul> <p>These benefits will be more important is IPM is applied in medium-to-large scale programmes.</p> |
| <b>WHY</b>     | <p>The environmental benefits of IPM will finally benefit the whole society. There is little information on their economic value, but there are some good examples. For example, in a study in the Philippines, the aggregate value of the environmental benefits for the five villages where an IPM programme was carried out was estimated at \$150,000 (US).</p>   |
| <b>HOW</b>     | <p>The quantitative estimation of environmental benefits is difficult, as most of them do not a market price and the environment is multi-dimensional, and usually requires medium-scale multi-year experiments. Furthermore, as their value is highly dependent on the people and the communities involved, this question is very open to discussion.</p> <p>Therefore begin the session by asking the participants about their perception on the value of environmental benefits and later show examples of these benefits. The examples may show the increase in natural enemies or general fauna in a plot or in an area, the reduction of ground water pollution, or the estimation of the economic value of the environmental benefits of IPM.</p>  |

**SOURCES**

- ▶ Cuyno, L.C.M.; Norton, G.W.; Rola, A. 2001 Economic analysis of environmental benefits of integrated pest management: a Philippine case study. *Agricultural Economics* 25: 227-233
- ▶ Rieux, R.; Simon, S.; Defrance, H. 1999. Role of hedgerows and ground cover management on arthropod populations in pear orchards. *Agriculture, Ecosystems and Environment* 73 (1999) 119±127

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| <b>ARGUMENT</b><br><br><b>A 9</b>   | <h1>MRL (Maximum Residue Levels)</h1> |
|  | <b>Environmental</b>                  |

Date (05/10/2009)

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| <b>WHAT IS</b> | <p>Maximum Residue Levels (MRLs) are the legal levels for the maximum concentration of pesticide residues in or on food or feed. MRLs are set for a wide range of food commodities of plant and animal origin, and usually apply to the product as put on the market (for example, oranges including the peel or stone fruit including the stones). MRLs are not simply set as toxicological threshold levels, but are derived from a comprehensive assessment of the properties of the active substance and the residue behaviour on treated crops. An indispensable precondition for setting MRLs is the performance of a risk assessment to ensure consumer safety.</p> |
| <b>WHY</b>     | <p>For every active ingredient included in a phytosanitary product, there is a MRL defined for every crop.</p> <p>The MRL is linked with the rate, pre-harvest delay and good agricultural practices for application of the products.</p> <p>For farmers, it is essential not to exceed MRLs, which can cause delayed harvesting to ensure the proper degradation of pesticides.</p> <p>The use of IPM or alternative measures decreases the risk of pesticide residues in food and feed.</p> <p>There are no MRLs for pheromones and products containing micro-organisms.</p>   |
| <b>HOW</b>     | <p>During the training session, highlight the issues participants need to know in order to use actively information on MRLs. Visualise the influence of substituting current practice with technical systems or IPM alternatives (show data from experiments etc.)</p> <p>You can show farmers the different advantages of IPM:</p> <ul style="list-style-type: none"> <li>▶ Less risk when using MRLs actively.</li> <li>▶ Fewer or no constraints on pre-harvest delays if using a more 'IPM-like' approach.</li> </ul> <p>Show practical solutions.</p>   |
| <b>SOURCES</b> | <p>European database for MRLs of pesticides:<br/> <a href="http://ec.europa.eu/sanco_pesticides/public/index.cfm">http://ec.europa.eu/sanco_pesticides/public/index.cfm</a></p>  |

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| Argument<br><br>A 10  | <h2 style="margin: 0;">Workers' safety<br/>and waste management</h2> |
|  | Environmental  |

Date (16/06/2010)

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| <b>WHAT IS</b> | <p>If not used appropriately, pesticides can be dangerous for those applying them and for the environment. The risk can be reduced by eliminating or reducing the hazard and/or exposure to the products concerned.</p> <p>Hazard is the effect of the product (active ingredient, surfactants) on health. Certain pesticides can produce acute or long-term effects if not used correctly.</p> <p>Exposure is a result of farmers' practices.</p> <p>The primary reduction in hazard is already achieved during the registration of the product. However, by implementing IPM principles, the risk of using pesticides can be reduced even further.</p>  |
| <b>WHY</b>     | <p>One of the principles behind IPM is to only use pesticides if there is no effective alternative. According to this principle, the risk of using the pesticides should also be reduced, as a smaller amount will be used and less waste produced.</p>   |
| <b>HOW</b>     | <p>Raise awareness of the risks of using pesticides by sharing with farmers this definition: <b>Risk = Hazard x Exposure</b>.</p> <p>You have to work with them on the definitions of the three components of the application of pesticides:</p> <ul style="list-style-type: none"> <li>▶ Knowledge of the danger: risk phases, hazard during the different phases of used products, features of products used.</li> <li>▶ Knowledge of exposure: direct exposure by handling products, indirect exposure through contact with contaminated equipment, plants treated.</li> </ul> <p>Spend some time with farmers to demonstrate how the reduction of pesticide use is a way to reduce risk:</p> <ul style="list-style-type: none"> <li>▶ By reducing the use of hazardous products (<a href="#">IPM General Principle 5 / The pesticides applied shall be as specific as possible for the target and shall have the least side effects on human health, non-target organisms and the environment</a>);</li> <li>▶ By increasing the use of products with lower or no risk (pheromones, biological controls)</li> <li>▶ By using more non-chemical measures (<a href="#">IPM General Principle 4 / Sustainable biological, physical and other non-</a></li> </ul> |

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|                       | <p>chemical methods must be preferred to chemical methods if they provide satisfactory pest control).</p> <p>Ensure that you analyse with them the hazard of alternative solutions. Some bio pesticides are hazardous, for example, <i>Bt</i> products are irritants or sensitizers.</p>  |
| <p><b>SOURCES</b></p> | <p>You can find relevant information on the <a href="#">ENDURE Information Centre</a>:</p> <p><u>Keywords:</u> Measure &gt; legislation &gt; approved pesticides<br/>Or Measure &gt; non-chemical control</p> <p>Point source pollution and handling of pesticides:<br/><a href="http://www.topps-life.org/web/page.asp">http://www.topps-life.org/web/page.asp</a></p> |