

# GOOD PRACTICE SHEET N° 4

## INTEGRATED PEST MANAGEMENT (IPM)

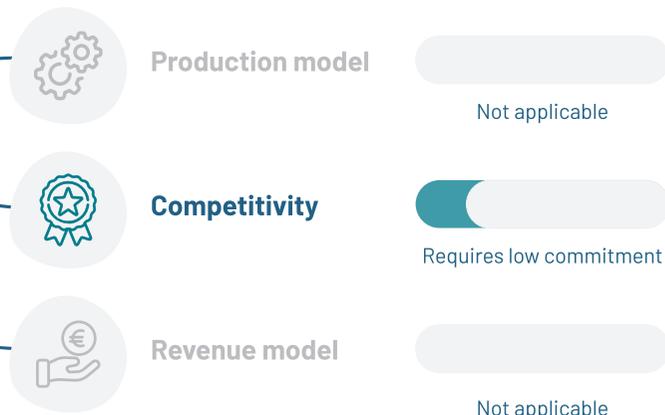
### What is IPM?

Integrated pest management (IPM) is a sustainable approach to manage pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks. Integrated pest management keeps the use of plant protection products and other forms of intervention to levels that are economically and ecologically justified.



Source: Smart Intl College, London

Which **impactful changes** can IPM bring to your business model transformation?



### Why should you implement IPM?

An integrated pest management (IPM) approach integrates preventive and corrective measures to keep pests from causing significant problems, with minimum risk or hazard to humans and desirable components of their environment. IPM is a flexible, dynamic strategy, updated periodically as information is received from management practice results. Ultimately, IPM is a site-specific strategy for managing pests in the most cost-effective, environmentally sound and socially acceptable way.

### What are the environmental and agronomic needs addressed by IPM ?

- 
**Improve soil fertility and biodiversity**
- 
**Reduce water and environmental pollution**

### What are the economic needs addressed by IPM ?

- 
**Reduce pesticide costs**
- 
**Maintain stable yields**

## What are the key figures for IPM ?

### AGRO-ENVIRONMENTAL IMPACTS

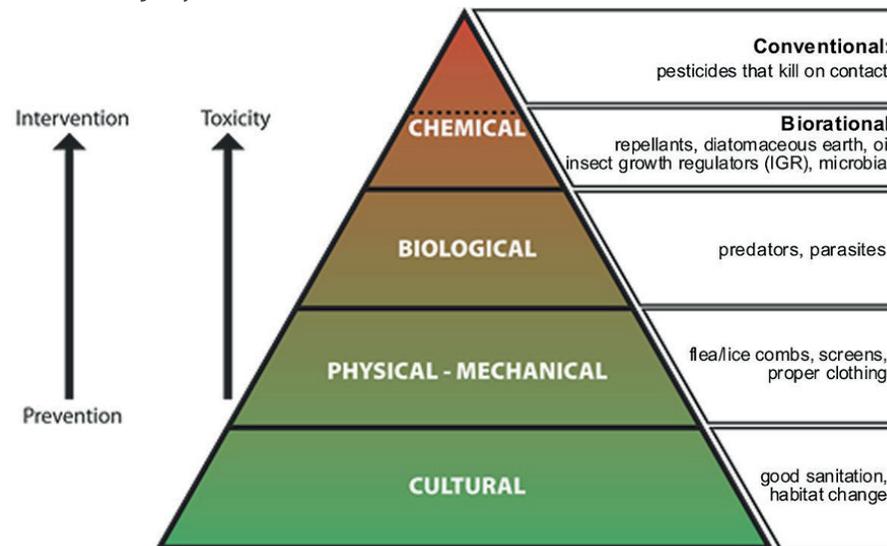
In apple orchards, IPM practices can **reduce pesticide use by 50% compared to conventional apples** (Marette and al., 2012)

In Southeast Asia, farmer training programs attained a staggering **92% pesticide reduction in rice** (Bangladesh) or **50-70% reduction in tea and cabbage** (Vietnam) (van den Berg 2004). In addition, the International Rice Research Institute (IRRI) attained **50- 80% cuts in insecticide use on millions of rice farms without any noticeable yield loss** (Bottrell and Schoenly 2012).

**Insecticide consumption can be reduced by up to 80%** of total use.

Despite the success of IPM over the last 50 years, **significant challenges remain to improve IPM delivery and adoption**. Whereas IPM provides an avenue for more rapid system self-correction, **efforts to improve IPM adoption often fall short because the system does not economically reward IPM adopters**, even as the benefits accrue system wide.

(Source : Magarey and al., 2019)



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### ECONOMIC IMPACTS

In apple orchards from across 5 European regions, **IPM strategies are expected to increase total yield by 29%** (Source : Aubertot, PURE project, 2020)

In the USA, the Huffaker IPM project attained a **70-80% reduction of a wide set of pesticides on more than 5 million hectares resulting in more than \$500 million annual savings** (Pimentel and Peshin 2014).

Studies were conducted on **customers' willingness to pay** based on IPM practices :

- **20% not willing to pay more and about 25% willing to pay 15% or more for food products with no pesticide risk.**
- **Households willing to pay \$14 per year for groceries if all pesticide risks were eliminated**

### POTENTIAL DEVELOPMENT

Earlier models of integrated pest management (IPM) focused on ecological aspects of pest management. With the recent developments in agricultural technology, changing consumer trends, increased awareness for sustainably produced food systems, there seems to be a **need to revisit the IPM paradigm. A new model, based on ecological and economic aspects, is expanded and reconfigured to include management, business, and sustainability aspects**. The management aspect contains four components of IPM that address the pest management options, the knowledge and resources to develop management strategies, the time management, and the dissemination or sharing of information. (Source : Dara, 2019)

## How to implement IPM?

### ON-FARM ISSUES

- 1 Decrease in crop yields
- 2 Health problems related to exposure to plant protection products
- 3 High cost of pesticides
- 4 High severity of pest infestations
- 5 Degradation of environmental and water quality



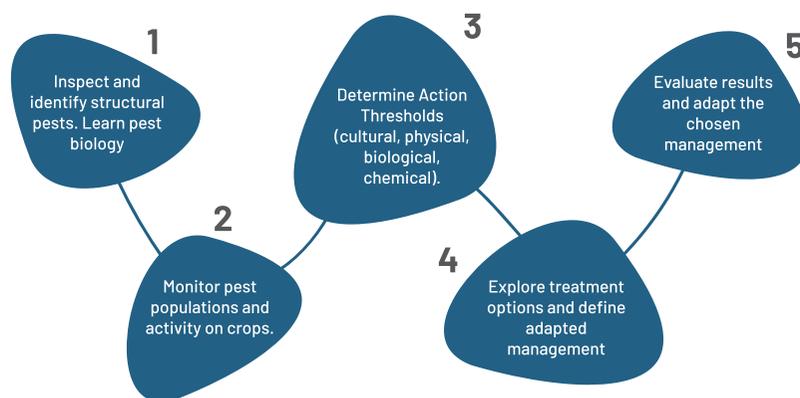
### FIELD ADVICE

"I am able to make better use of fertilizers and to choose the right variety of tomato to plant on my farm. On the family farm, besides tomatoes, we also plant squash, peas, bean and okra for the local market and for family consumption; so, we don't need to buy any vegetables and most notably, by decreasing the amount of pesticide up to 55%, we save a lot of money! With the income from the farm, we can buy other goods for the family and pay for the inputs needed for the new planting season without stress. We are now aware of the importance of producing and eating food free of pesticides. We don't get poisoned and then... sick anymore! With time, I gained confidence, skills and information about IPM and agriculture in general." Ms. Asma Al-Eshoush, Jordanian vegetable farmer

"Now I have more confidence in agricultural activities and in olive trees. I have learnt about insects, diseases and how to manage olive pests with traps and environmentally friendly practices, how to prune olive trees, how to fertilize my grove at the right time and in the right way. I improved my knowledge and skills, but I also succeeded in growing olives, obtaining a good profit by producing high quantity and quality of olive oil. I am delighted that we found a way to out of the devastation left by the war and to have kept my father's dream alive! I hope that one day we will be able to export from Srifa our IPM product from Srifa so people around the world can taste the high quality Lebanese olive oil." M. Abou Chadi, Lebanese olive grower



### KEY STEPS TO A SUCCESSFUL IMPLEMENTATION



### IMPACTS AND BENEFITS

- 1 Increasing crop yield and farmers' income
- 2 Protect the health of farmers and their families from plant protection products
- 3 Save on costs by reducing pesticide levels
- 4 Decreased severity of pest infestations
- 5 Decreasing chemical applications and preventing pesticide leakage



### KEY CHALLENGES

#### Time and energy-consuming

Application of IPM takes time, and the expected results of intervention may take long time to be achieved as well. The main time investment is needed in planning itself.

#### Technicalities of the method

IPM needs to be planned on a long time, it demands more attention and dedication and requires expertise of various field.

#### Lack of supportive government and policies

The lack of awareness and political support for IPM is one of the main obstacles to the development of the approach.

## How to go further?



### MORE INFORMATION DOCUMENTS AND DATA

**Boulahia-Kheder, S., Chaaabane-Boujnah, H., Bouratbine, M., Rezgui, S. (2015):** IPM based on mass trapping systems: a control solution for *Ceratitis capitata* in organic citrus orchard of Tunisia. – Research Journal of Agriculture and Environmental Management 4(10): 459-469.

**Civantos, m. & Caballero, Juan M. (2008).** Integrated pest management in olive in the Mediterranean area. EPPO Bulletin. 23. 367 - 375. 10.1111/j.1365-2338.1993.tb01338.x.

**Elekcioglu, Naime. (2020).** Efficacy of IPM, mass trapping and chemical control in the suppressing of mediterranean fruit fly, [*ceratitis capitata*] in citrus. Applied Ecology and Environmental Research. 18. 10.15666/aeer/1801\_185199.

**Elshafie, Hamadttu. (2019).** Integrated Insect Pest Management. 10.5772/intechopen.81827.

**Peshin, Rajinder & Bandral, R S & Zhang, Wenjun & Wilson, Lewis & Dhawan, Ashok. (2009).** Integrated Pest Management: A Global Overview of History, Programs and Adoption. 10.1007/978-1-4020-8992-3\_1.

**Vacante, Vincenzo & Bonsignore, C. (2012).** Implementation of IPM in Citriculture. 10.2174/978160805294311201010028.



### DISCUSS AND TEST PROJECTS, TOOLS AND NETWORKS

**INTOMED : Innovative tools to combat crop pests in the Mediterranean.** INTOMED aims to identify, develop, validate and promote effective and sustainable Integrated Pest Management (IPM) tools by (a) exploiting beneficial interactions between plants and soil-borne microbes and (b) identifying naturally derived key molecules (peptides, metabolites and RNAs) to enhance the resistance of economically important Mediterranean crops against major agricultural arthropod pests and pathogens, as well as by (c) assessing the social acceptability of the proposed tools by end-users. Soil-borne beneficial microbes have long been recognized for their ability to improve plant growth and nutrition and prime the plant immune system against pathogens and herbivores in plants..

**C-IPM project (Coordinated integrated pest management in Europe).** The major objective of C-IPM was to contribute to research defragmentation by coordinating national IPM research and extension efforts as well by pooling existing resources. Through a consortium of 34 partners from 21 countries, C-IPM has been able to position IPM in the European innovation landscape by interacting with a large number of stakeholders and researchers. C-IPM has created a forum among its partners for exchange and identification of IPM research needs and gaps, strength and weakness and future direction to overcome the existing IPM challenges. C-IPM made it possible to build up a Strategic Research Agenda for IPM in Europe that covers four main themes.



### TAKE ACTION FUNDING SOURCES

**Horizon Europe.** The biggest EU Research and Innovation program with nearly €95 billion of funding available over 7 years (2021 to 2027). The program includes a specific section on climate action, environment, resource efficiency and raw material which can be relevant for research in the fertigation field.

**The Partnership on Research and Innovation in the Mediterranean Area (PRIMA)** offers various grants for consortia consisting of public and private actors in the Euro-Mediterranean region who are dealing with farming, agro-food systems and value chains, as well as water resources. It is a ten-year initiative (2018-2028), partly funded by EU's research and innovation program Horizon 2020. Its main objective is to devise new research and innovation approaches to improve water availability and sustainable agriculture production in a region heavily distressed by climate change, urbanization and population growth. It supports sustainable farming systems under Mediterranean environmental constraints.