Integrated Pest Management

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CROPLIFE INTERNATIONAL POLICY ON IPM

CropLife International and its member companies and associations support sustainable agriculture to produce sufficient, affordable food and fiber in an environmentally and socially sensitive manner. Our goal is to maintain the natural resource base for future generations.

We are committed to Integrated Pest Management (IPM)—an economically viable, environmentally sound and socially acceptable approach to crop protection—as defined by the International Code of Conduct on Pesticide Management. It is the mission of our member companies to provide customers with safe and effective technologies to protect against adverse effects caused by pests, diseases and weeds.

Our member companies enable and encourage the implementation of IPM by developing and promoting appropriate products and services. We cooperate with partners to develop and test IPM strategies and programs as well as provide education and training on the sustainable use of crop protection products. We measure and communicate progress within our industry on the adoption of the principles and values of this declaration.

What is IPM?

According to the Food and Agriculture Organization (FAO) of the United Nations*, IPM means considering all available pest control techniques and other measures that discourage the development of pest populations, while minimizing risks to human health and the environment.

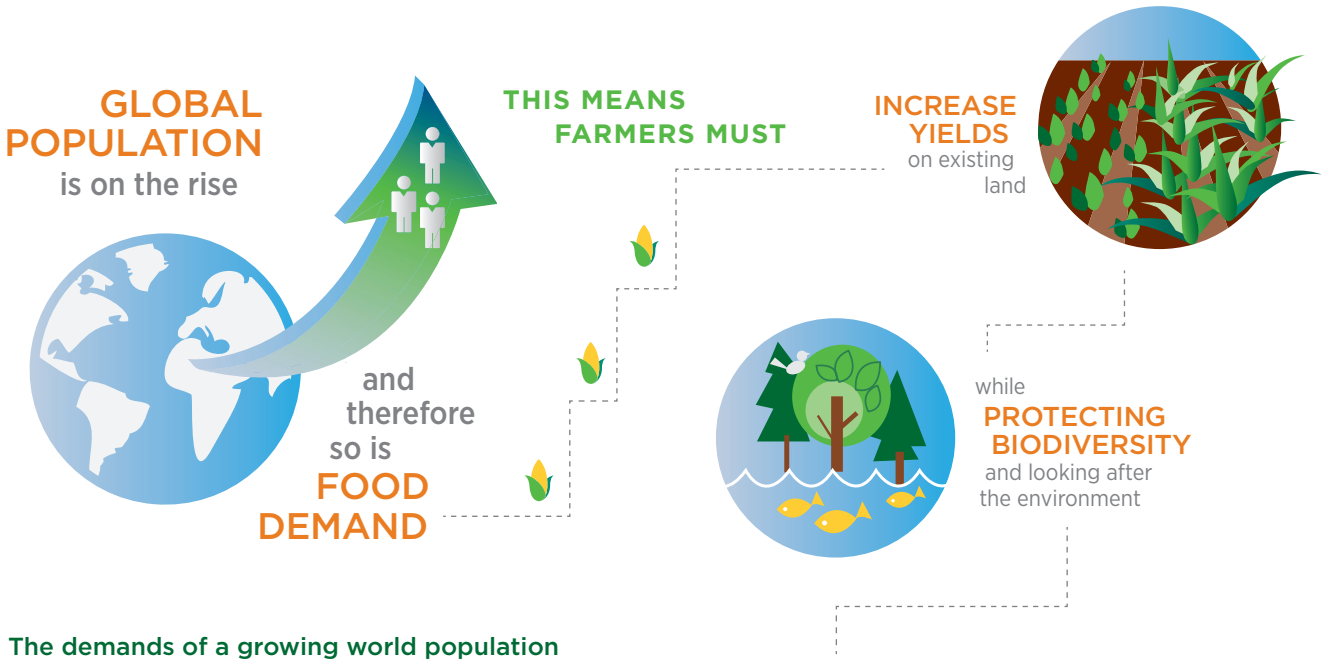
For farmers, IPM is the best combination of cultural, biological and chemical measures to manage diseases, insects, weeds and other pests. It takes into account all relevant control tactics and methods that are locally available, evaluating their potential cost-effectiveness. IPM does not, however, consist of any absolute or rigid criteria. It is a flexible system that makes good use of local resources and the latest research, technology, knowledge and experience.

Ultimately, IPM is a site-specific strategy for managing pests in the most cost-effective, environmentally sound and socially acceptable way. Implementation of IPM lies with farmers, who adopt practices they view as practical and valuable to their activities.

IPM allows farmers to manage diseases, insects, weeds and other pests in a cost-effective and environmentally sound way.

* Integrated Pest Management (IPM) means the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms. (FAO, 2012).

Why is IPM Important?



The demands of a growing world population for food and fiber require farmers to produce more crops on existing farmland. To increase these yields requires continuous improvement of agricultural technologies to minimize crop losses. The challenge is to do this while protecting the environment.

IPM is a big part of the solution. Increasingly it is being adopted in both developed and developing countries for long-term, sustainable agriculture that achieves adequate, safe and quality food production, improves farmer livelihoods and conserves non-renewable resources.

Benefits of IPM

IPM provides multiple benefits for society and the environment.
It is vital for the long-term future of the plant science industry.

- Improved crop profitability due to better pest control measures and appropriate use of crop protection products
- Stable, reliable and quality crop yields
- Decreased severity of pest infestations
- Reduced potential for problems of pest resistance or resurgence
- Increased consumer confidence in the safety and quality of food and fiber products

Crop protection companies that integrate IPM principles into marketing and customer support for their products also stand to benefit from:

- Sustained market share and access
- Less risk of restrictions or deregistration
- New opportunities for established and novel products, techniques and services
- Longer product lifecycles
- Decreased resistance of pests to crop protection products and biotech plants
- Increased public confidence in, and credibility of, the crop protection industry

IPM Components

IPM requires competence in three areas: prevention, monitoring and intervention.

PREVENTION

Prevent the build-up of pests

Includes a range of practical strategies that suit local conditions.

MONITORING

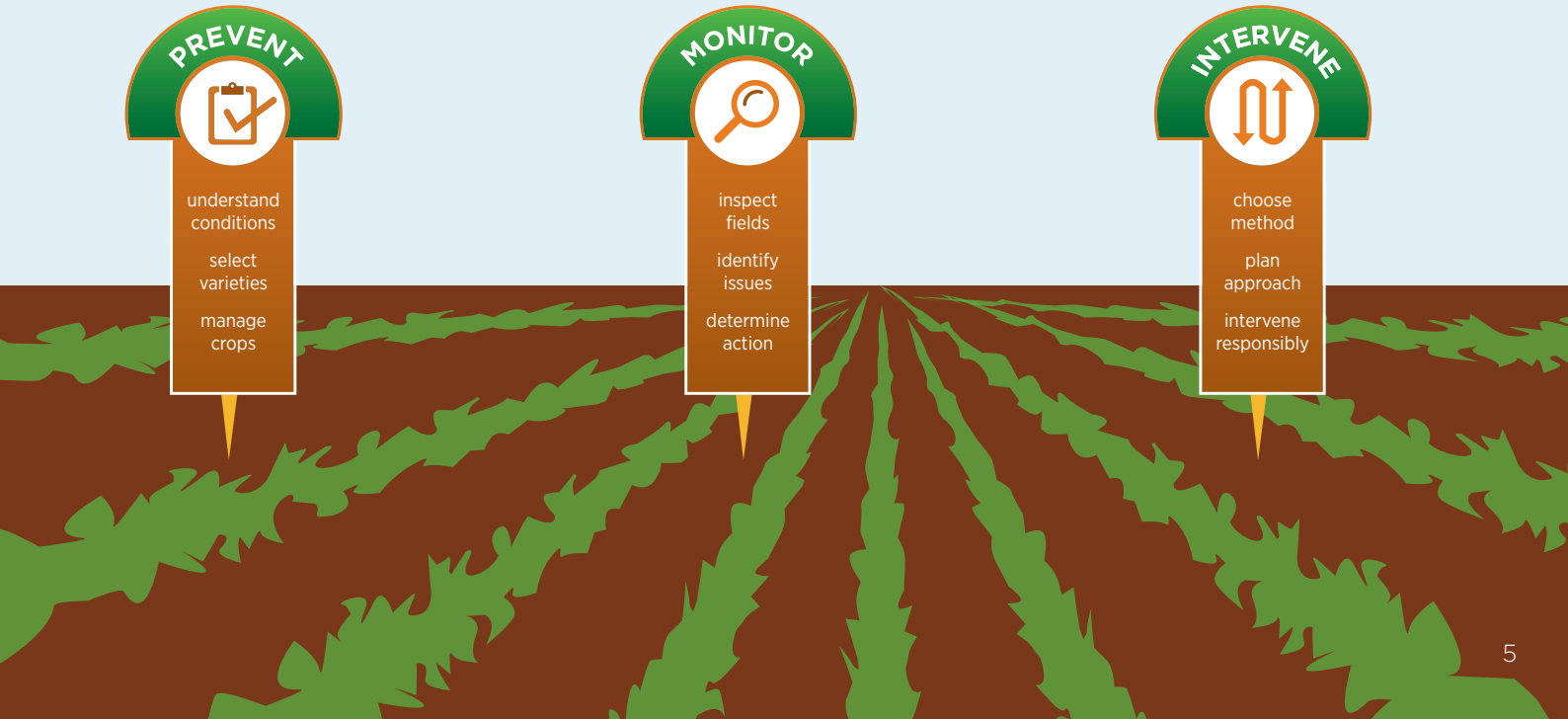
Monitor crops for both pests and natural control mechanisms

Involves scouting for pests (insects, diseases and weeds) to determine if, when and how intervention should occur.

INTERVENTION

Intervene when control measures are needed

Involves physical, biological and chemical methods to preserve the economic value of crops with minimal effects on the environment.



Prevention

Many aspects of crop management are designed to prevent initial outbreaks of insects, diseases or weeds. Practical strategies (outlined below) can be combined and optimized for an IPM program. The goal is to prevent pest populations from building up to economically damaging levels.

CROP LOCATION

Growing crops in locations where they are best suited to climate, soil and topography provides them with optimal conditions from the start. Appropriate land preparation builds on these conditions.

VARIETY SELECTION

Choosing beneficial crop varieties, such as those with disease and pest resistance, has always been a cornerstone of IPM. These varieties can be derived from traditional cross-breeding or modern biotechnology: pest-resistant and herbicide-tolerant varieties, for example, may reduce the need for other crop protection measures. Biotech crops can also facilitate reduced or no-till practices, helping to maintain soil health and prevent erosion.

STRATEGIC PLANTING AND CROP ROTATION

Planting similar crops alongside each other can substantially increase pests and should be avoided if possible.

Traditionally, some farmers sow different crops in alternate rows or undersow a crop like maize with a legume such as cowpea to help improve soil fertility and reduce weeds. Such systems can help reduce pests.

Growing different crops in rotation also helps reduce the build-up of pests, especially those in the soil such as root-feeding insects and fungi. Rotations can reduce weed problems and increase the range of weed control methods that can be used.

SOIL MANAGEMENT

Mechanical, physical and cultural crop protection methods prevent or minimize pests as well as reduce their build-up and carryover from one crop to another. For example, traditional ploughing ("tillage") turns the soil and buries crop residue and weeds before the seed bed is prepared for the next crop.

However, tillage has led to increased erosion as well as loss of soil moisture and organic material. In many countries, there has been a trend towards reducing tillage and using herbicide-tolerant biotech crops. This has led to increased practice of direct drilling in Europe and no-till in the United States and Canada. As a result, soil erosion problems have been greatly reduced.

WATER MANAGEMENT

Supplying water to crops is essential to plant health but it can greatly influence pest incidence and impact. Irrigation may be required, especially in dry areas or with crops that require a lot of moisture. But while flood irrigating some crops, such as lowland rice, can control weeds, it is wasteful of water and can adversely affect beneficial soil organisms. Methods to combat these risks and conserve water include drip irrigation or growing crops on ridges or raised beds.

OPTIMIZING PLANT NUTRITION

Different soil types contain varying amounts of nutrients. At harvest, nutrients are removed with a crop from the soil. In order to maintain or improve soil fertility, these nutrients have to be replaced with mineral and/or organic fertilizers. These products must be applied at the right time in the correct amounts to optimize soil health. New plant varieties with more efficient uptake of nutrients should be considered.

HARVESTING AND STORAGE

Carryover of weed seeds and disease-causing organisms can be reduced with good harvesting, seed cleaning and storage methods.

PRESERVING BIODIVERSITY

Protecting natural habitats near farmland is the best way to conserve biodiversity, including many natural pest enemies. Careful management of farmland edges, including trees and hedges, is important for wildlife habitats, providing cover and refuge for beneficial insects and animals (e.g., field bunds in rice paddies provide refuge for predatory spiders that help control several insects).

Monitoring

Observing crops determines if, when and what action should be taken to maximize crop production and quality. Decision-making tools range from pegboards to computers and trained local experts to remote-sensing technologies. Getting real-time information on what is happening in the field is ideal.

Management of any crop requires routine inspections to assess how well plants are growing and what actions need to be taken from seeding to harvest. Walking through a field involves scouting for pests and distinguishing them from non-pests and beneficial insects. Tools like pheromone traps, diagnostics and forecasting systems can assist with such monitoring in a timely and accurate way.

IPM often requires collaborative decisions within a specific geography to provide effective control of pests. Some of these decisions need to be taken by national governments in relation to quarantine regulations and legislation, provision and training of advisory services and strategies for control of highly mobile pests like locusts. Geographic information systems and remote-sensing techniques can also assist in area-wide management.

Intervention

Reducing economically damaging pests to acceptable levels may involve cultural, physical, biological and chemical control measures individually or in combination. Costs, benefits, timing, labor force and equipment as well as economic, environmental and social impacts all have to be taken into consideration.

CULTURAL AND PHYSICAL METHODS

These techniques, such as weed control by tractor cultivation or disease control by removing infected plant debris, should be assessed for their impact on plant roots and yields as well as their requirements for labor and energy. Also, the possibility of integrating cultural techniques with the careful use of crop protection products should be explored. For example, instead of replacing manual weeding entirely with herbicides, hoeing may be used in conjunction with them.

BIOLOGICAL CONTROL

Research on nature's own methods of pest control is yielding new products and methods that can be used in IPM programs. Many of these require similar technical expertise as crop protection products in relation to formulation, field application and resistance management.

These controls include introducing beneficial insects or predators; applying micro-organisms such as viruses, fungi and bacteria; and using pheromones to lure, trap and kill or interfere with insects' mating habits.

Using beneficial insects to control pests works best when crops are grown in controlled environments like greenhouses and plastic tunnels. There are cases when control techniques with living organisms are successful in open field conditions, such as using predatory mites against spider mites. However, biological control products are usually only efficient at low pest intensities and other interventions are often required.

Bacteria, fungi, nematodes or viruses have also been mass produced to control some pests. The most common and successful is *Bacillus thuringiensis (Bt)*, a naturally occurring bacterium, which has

been used to control several important pests (e.g., caterpillar pests in vegetables, vineyards and orchards). With modern biotechnology, crops like corn and cotton can now express the insect toxin produced by this natural control agent, delivering it more effectively.

Finally, the development and availability of insect sex pheromones and other behavior-modifying chemicals offer farmers the possibility of:

- **Selective trapping techniques to monitor the movement of pests or changes in their populations during the season**
- **"Lure and kill" strategies to attract the pest to insecticide deposits and reduce the need for overall crop spraying**
- **Mating disruption that slows population build-up to delay or reduce the need for control treatments**

Biotechnology also has considerable potential to contribute to IPM. One focus of research has been on mass production of micro-organisms that cause disease in insect pests and weeds or compete with plant disease-causing organisms. The second and most rapidly expanding area of biotechnology for pest control has been the development of crop varieties resistant to pests and diseases and/or tolerant to herbicides. These varieties incorporate insect or disease resistance within the plant for accurate and timely delivery of an active ingredient.

CHEMICAL CONTROL

Chemical crop protection products (pesticides) are biologically active chemicals that control a range of insect and vertebrate pests, diseases and weeds. They are often the most cost-effective way of controlling infestations as part of an IPM strategy. Today's crop protection products are the result of more than 50 years of research, development and field experience around the world by the plant science industry.

Before crop protection products are released in the market, they are thoroughly tested for their safety, usefulness and effectiveness. When sold, they are labeled with explicit use instructions.

To get the most out of these products, they must be applied correctly. Responsible use and good handling practices limit potential pesticide residues in crops and the environment as well as help avoid pest resurgence and resistance.

Improved application techniques and equipment, such as reduced drift nozzles and spot spraying, help farmers protect untreated refuges (e.g., hedgerows and field margins) and natural habitats for wildlife and pest enemies. The timing of treatment (season and time of day) as well as the types of products used are also critical factors.

IPM Strategies and Tools

IPM includes the development and use of chemical, natural, biological and biotech products for pest control. It may also involve computer-aided sampling and decision-making as well as improved farm equipment.

Farmers are the primary decision-makers in IPM programs. Individually or collectively, they have to decide how to manage all pests that may damage crops. The role of the plant science industry is to provide access to a wide range of useful technologies, products, services and as much information as possible on their characteristics, costs, specificities and optimal use strategies. Most farmers will combine different IPM tactics and tools.

As a prerequisite to developing an IPM program, it is important to understand farmers' perceptions of pest problems and their current practices of pest control. IPM recommendations must be flexible enough to adjust to changes in the environment, cropping patterns and market forces. The socio-economic effects of IPM components must also be examined. For example, the use of herbicides reduces farm labor but may contribute to urban migration. On the other hand, manual weeding is time-consuming, labor-intensive and not always possible to perform at the right time. This is problematic since yields of some crops suffer due to late weeding and root damage.

SETTING AN ECONOMIC THRESHOLD

The extent of economic losses can vary significantly between seasons, depending on weather conditions and other factors. Since the severity of pest infestations varies, it is generally far better to monitor pest populations or the damage they cause before deciding to use a crop protection product or other intervention. Once an infestation has reached an "economic threshold"—the point at which the pest population level causes losses greater than the cost of controlling the pest—it is time to intervene. Alternatively, modelling, for example based on weather conditions, can indicate the need to intervene before the pest reaches the economic threshold (e.g., late blight in potato).

One difficulty with the use of an economic threshold as a decision tool is that it depends on the value of the crop. Income from the sale of crops can change rapidly based on supply and demand in local markets. The threshold is also dependent on pest populations and the stage of crop development at which it occurs. This matters because many crops can compensate for some damage during part of their growth cycle. Pest-resistant varieties can reduce the severity of an infestation, but pest populations must still be monitored to see if additional intervention is required.

Farmers need simple methods for quickly determining whether a pest population in a crop is likely to cause economic damage. Local knowledge can be used to help develop practical methods acceptable to farmers. In some regions, it may be possible to develop local databases to assist in making decisions on an area-wide basis.

PROTECTING NATURAL ENEMIES

Conserving natural enemies of pests is an important part of IPM and helps to prevent pest resurgence. The effect of a crop protection product or other intervention on both pests and their natural enemies needs to be considered. Timing product application to periods when natural enemies are not active, for example, may help protect them. Maintaining minimum pest and non-pest populations for natural enemies to feed on may be essential for their survival. Research should also assess the importance of weeds and other local plants that may encourage survival of beneficial species at field edges.

Populations of beneficial species can recover quite quickly, even when broad-spectrum products are used and particularly if they are easily degradable. This occurs with the migration and recolonization of sprayed areas from refuge areas at field margins. It is also possible to physically limit the impact of broad-spectrum products; part of a crop area can be left untreated to allow natural enemies to survive and recolonize the treated areas.

Farmers and their advisors can use a range of technologies in IPM programs.

Selecting them requires appropriate tools, knowledge and expertise like:

WHEN AND HOW to manage pests

RESPONSIBLE USE of crop protection products

SELECTING THE RIGHT PRODUCTS

In developing an IPM program with crop protection products, it is essential to review product characteristics, applications and costs, then select the ones that provide the most cost-effective treatment with minimal undesirable effects. Some products have a broad spectrum of activity, while others only target a few types of pests. Selective substances are less likely to affect natural enemies and other non-target organisms, but they are often more expensive and less widely available. When they are available, it is important to determine if fewer applications of them are more cost-effective than a cheaper, broad-spectrum product that requires more applications. Seed treatments, which protect seedlings from early pests, are also beneficial and may prevent the need for crop protection product applications later on. They minimize the impact of crop protection products as the active ingredient is often within the plant where beneficial species do not come into contact.

Most crop protection products have a broad spectrum of activity and it's important to distinguish between their intrinsic toxicity and bioavailability—the degree to which the active ingredient is absorbed or becomes available to pests in the field. While an active ingredient may be toxic to a range of insects, it may not be bioavailable to non-pests. For example, when an active ingredient is contained within plants (*Bt* biotech crops), it does not impact species that do not eat the plant. Also, how crop protection products are applied and how long they remain in the environment matters. For instance, compounds that penetrate plant leaves and degrade quickly on leaf surfaces may have a minimal impact on non-pests.

USING PRODUCTS RESPONSIBLY AND SAFELY

Every crop protection product should be used according to manufacturer recommendations. These are designed to provide reliable control under normal field conditions. They also provide instructions on how to handle and apply the product safely. Recommended doses should be used to control pests and prevent them from developing resistance to products. Guidelines on the appropriate storage, transport and disposal of unused products and empty containers should also be strictly followed.

Mindful farming practices, such as directing crop protection spray to the undersides of leaves where insects are located, can better control pests.

Targeted and timely application of crop protection products is key to effective and efficient pest control. This requires the use of appropriate and well maintained equipment as well as knowledge of pests. Many insects can survive under the "umbrella" of leaves if farmers only spray leaf tops by holding the nozzle above the crop. In excessive applications, the spray runs down the tops of leaves and drips onto the soil. This wasted spray can have serious adverse effects on soil-dwelling natural enemies, especially spiders and ants. When farmers see pests surviving, they will often spray crops as frequently as twice a week instead of investing in better equipment or changing their spraying practices or products. Simple changes in farming practices like directing the nozzle to spray where the pest is located on the undersides of leaves or controlling spray pressure can improve crop protection product coverage and better control pests.

Some farmers spray late or alter the dose because of difficulties in obtaining sufficient water to spray, especially in semi-arid and dry areas. However, there are reduced volume techniques that allow farmers to treat pests more quickly when their population reaches the economic threshold. In other situations, granule application is more appropriate as the product can be localized to the root of a crop or in the "funnel" of maize plants.

PREVENTING PEST RESISTANCE TO CROP PROTECTION PRODUCTS

All farmers are challenged with the fact that pests adapt to active ingredients and eventually become resistant to them without prevention strategies. IPM offers a range of ways to reduce the risk of resistance developing. This includes monitoring pest populations, applying treatments when the economic threshold is reached and implementing strategies, such as alternating or mixing compatible crop protection products or biotech seeds with different modes of action.

To prevent or delay the onset of resistance, farmers or pest control advisors need to understand target pest biology and ecology; the efficacy of the crop protection product and the pest's sensitivity to it; stacked versus single insecticidal traits; product usage patterns; local cropping systems; and the availability of alternative pest management options, including biotech, chemical, biological and cultural controls.

Biotech insect-protected crops express proteins for insect control internally, offering excellent protection from damaging pests around the world. These crops can also offer superior environmental benefits while increasing grower income. Given this value, insect resistance management is essential. Strategies include planting "refuge" areas that don't contain biotech traits; scouting and applying crop protection products as needed; rotating different modes of action; restricting the use of a single insect control protein across multiple crops; destroying crop residues; using locally adapted crop varieties with native resistance; and combining multiple traits targeting the same pests within a plant.

The continued development of novel active ingredients for crop protection products and new biotech traits will expand the resistance management tools available to farmers. Additional tools will help manage pests economically and sustainably while protecting the effectiveness and value of all control options.

Plant Science Industry and IPM

The global plant science industry has a major role to play in the widespread adoption of IPM. This requires mutual support, partnerships and collaboration with governments, non-government organizations and research companies; international, national and local agricultural associations; crop protection product distributors, dealers and retailers; and, of course, farmers themselves.

THE PLANT SCIENCE INDUSTRY SUPPORTS IPM IMPLEMENTATION
through research, development, technology transfer, education and training.

To further develop IPM technologies and promote their use, the plant science industry can help by:

- **Integrating IPM awareness and principles into business plans and product development strategies**
- **Developing IPM skills and understanding among stakeholders**
- **Researching and developing new products and technologies, including:**
  - Crop protection products with new, specific active ingredients
  - Chemicals that modify pest behavior
  - Safer and more effective formulations and seed treatments
  - Biotech and biological control products that can be used in IPM
  - Diagnostic tools and pest population forecasting systems
  - Improved product application and safety to reduce spray drift, run-off and leaching into ground water
- **Supporting screening programs to monitor the effects of crop protection products on natural enemies and the environment**
- **Training and educating agricultural staff:**
  - With practical programs for farmers, distributors, dealers, advisors, agricultural schools and farm families as well as management, marketing, sales, and technical staff
  - Establishing IPM demonstration sites and farms
- **Offering marketing materials and sales services:**
  - Including IPM technical literature and educational materials
  - Integrating marketing and sales performance incentives with IPM success.
- **Participating in local projects that promote IPM, including those supported by the United Nations' Food and Agriculture Organization, World Bank, other development banks, donor agencies, non-government organizations and private sector players**

The global CropLife network has over

340 IPM PARTNERSHIPS worldwide.

STEWARDSHIP AND TRAINING

Long-term and sustainable adoption of IPM by farmers will only occur if they get information about it along with the tools and technologies to implement it. To this end, the plant science industry is actively engaged in farmer training and capacity building programs around the world, including partnerships with the public sector. Key components include:

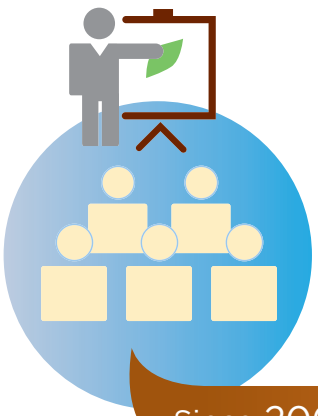
- **Training technical and teaching staff, who may teach advisory and sales staff about IPM.**
  - It's important farmers receive consistent messages from more than one source and all stakeholders are on the same page.
- **Training government, private extension staff as well as crop protection product and seed distributors and retailers.**
  - These people directly influence farmers and need to be able to provide practical advice about IPM.
- **Developing education and training programs for farmers.**
  - Practical ways of reaching farmers may include field schools, mass and social media, newsletters, direct mail, videos and posters.

A major goal of the training is to maximize product benefits and minimize their risks. Such training covers all aspects of handling and storing crop protection products, as well as when to use and when not to use them, including how to:

- **Identify pests and beneficial insects**
- **Assess risk of pest populations and potential crop damage**
- **Manage pests according to IPM principles**
- **Apply crop products safely and effectively if required**
- **Avoid unacceptable risks to people and the environment**
- **Minimize product residues on crops and monitor for pest resistance**
- **Store products safely and properly dispose of empty containers**

Responsible use training is carried out by our association network in more than 70 countries. As of 2013, more than 2.5 million farm workers, along with other groups, such as extension agents and trainers, have received training from the CropLife International network. These people then go on to inform or train more people, resulting in a significant multiplier effect.

Adoption of IPM is growing fast in both developed and developing countries due to the desire to achieve sustainable agriculture at national and international levels. IPM is supported by all major stakeholders involved in sustainable development from governments to donor agencies. In fact, legislation is increasingly being used by governments to support integration of IPM into farming practices. That's because IPM *is* the future of farming.



AS PART OF AN ONGOING COMMITMENT to stewardship, the plant science industry trains farmers on IPM best practices.

Since 2005 CropLife International IPM programs have trained over **2 MILLION** individuals

Thailand Boosts Fruit Exports with IPM

Thailand is a major fruit-exporting country with the European Union alone enjoying over 20 percent of its exports. To maintain and grow exports, applying internationally accepted IPM and good agricultural practices are essential to Thailand's success.

However, thousands of the country's small fruit farmers used to struggle with poor yields and many lacked knowledge of global safety standards for exportation. They used to apply crop protection products excessively and ineffectively. They had little knowledge of proper product use, personal safety and environmental protection. The results were low yields, high costs and unacceptable risks of crop protection product exposure.

Over the years, the Thai Crop Protection Association (TCPA) and Thailand's Ministry of Agriculture and Cooperatives' Department of Agricultural Extension have helped small-scale farmers bridge the knowledge gap. For example, in two years, almost 37,200 farmers were trained on IPM and the responsible use of crop protection products in Chantaburi. This success continued with 3,650 farmers trained in Phitsanulok in one year.

To help farmers retain their lessons, the master trainers distributed 7,000 responsible use manuals, and 10,000 related posters. TCPA also held eight exhibitions on the responsible use of crop protection products.

As of 2012, TCPA staff had trained a total of 123,550 farmers and 1,720 crop protection product retailers on IPM and good agricultural practices. These efforts have greatly improved Thailand agriculture, exports and protection of farm workers and the environment.

Guatemala Pioneers Responsible Use Training

More than 20 years ago, CropLife International selected Guatemala as a pilot country for farmer training on the management of crop protection products.

Agrequima, the crop protection association of Guatemala and a member of CropLife Latin America, was established shortly thereafter. Its mission is to improve domestic agriculture under the CuidAgro program, which trains farmers on IPM and the responsible use and storage of crop protection products as well as certifies qualified product applicators.

Since 1991, Agrequima has trained close to 800,000 farmers. It works with 14 partner organizations to reach tens of thousands of farmers annually. In 2012, for example, Agrequima trained about 50,000 farmers.

A professional staff of agronomists helped Agrequima design its own training program adapted to local conditions. In 1997, Agrequima entered into an agreement with the Guatemalan Ministry of Agriculture, Livestock and Food to train farmers on the responsible use of crop protection products at a national level. Today, the demand for farmer training continues to grow.

CuidAgro teaches farmers how to farm more efficiently, protecting their health and the environment. Surplus crops from increased productivity can be sold and increase household income. In addition, farmers who complete responsible use training earn a certificate from Agrequima that confirms they have undergone training in crop management. This satisfies the requirements of an international certification body and export companies that the farmer skills have been tested.

West Africa Protects Cocoa with Spray Service

Crop protection products are critical to the management of pests and disease in cocoa crops in West Africa, which produces about 70 percent of the world's cocoa.

The responsible use of these products is important to help farmers maximize crop production while minimizing product use and waste. Spraying requires specific skills and farmers need training on how to apply crop protection products properly.

To address this need, CropLife Africa Middle East, in partnership with the World Cocoa Foundation, has initiated a program to train small-scale cocoa farmers and registered crop protection product dealers as Spray Service Providers (SSPs) in Cameroon, Côte d'Ivoire, Ghana and Nigeria. SSPs receive special training to properly understand IPM and then hire out their services to fellow farmers.

The objectives of the training are to improve responsible use of crop protection products by establishing a network of SSPs; improve farmer accessibility to these products by linking SSPs to

product dealers; properly plan and manage stocks of these products; and provide a network to implement an empty container management program.

With support from the World Cocoa Foundation, CropLife Africa Middle East expects to train about 3,200 SSPs over two years. These SSPs, in turn, will help 40,000 farmers increase their crop production.

Indian Farmers Benefit from IPM Training

For farmers in the Adoni region of Andhra Pradesh, India, training on IPM has made a dramatic difference.

The "Training Through Local Partnerships" program was the result of a 2010 collaboration between CropLife International, CropLife Asia and CropLife India and two local Indian organizations. It incorporates activities such as inspecting crops, identifying beneficial insects, when to use and when not to use crop protection products, wearing personal protection equipment, safely storing crop protection products and triple rinsing empty product containers.

Collaborating with partners who understand local needs, master trainers trained by CropLife International directly train 5,000 farmers each year. These farmers, in turn, train other farmers in their community. In just four years since the program began, 45 master trainers were able to train 20,000 farmers, who then trained an additional 81,000 farmers. A total of 101,000 farmers were reached through this grassroots program with exponential impact.

Farmer practices were evaluated immediately after training and subsequently throughout the program with increasing positive results, including:

- **93 percent of farmers were able to identify beneficial insects following training and 94 percent two years later**
- **95 percent consistently understood pesticide labels right after training and 99 percent after two years**
- **94 percent of farmers wore some personal protective equipment immediately after training and 100 percent two years later**
- **98 percent consistently stored pesticides safely immediately following training and 99 percent after two years**

Europe Helps Protect Farmers and Public Health

The European Crop Protection Association launched its Safe and Sustainable Use Initiative (SUI) to provide farmers and operators with tools for the safe and effective use of crop protection products.

The industry-initiated program, now more than a decade old, is an important example of how knowledge transfer can spread good practices as part of a wider IPM strategy.

Currently, the crop protection industry has projects in 15 countries—Serbia, Portugal, Spain, France, Italy, Greece, Bulgaria, Poland, Lithuania, Cyprus, Slovakia, Croatia, Latvia, Turkey and Romania.

Before launching the SUI in a country, a baseline survey analyses the situation on the ground. Farmers are asked about their working methods, what personal protective wear they use and what their daily routine consists of in the field. This information helps determine key factors of success for each country. After a defined amount of time, another survey is undertaken in order to verify the uptake of the SUI recommendations. For example, in Poland a follow-up survey in 2013 showed a large increase in the number of orchard growers wearing gloves, protective coveralls and face shields in tank mix operations.

Regular monitoring of performance indicators has shown that easy-to-implement best practices have been taken up by crop protection product users in a short amount of time, increasing protection of human and environmental health.

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CropLife International is the voice of the global plant science industry. It champions the role of agricultural innovations in crop protection and plant biotechnology in supporting and advancing sustainable agriculture; helping farmers feed a growing population while looking after the planet; and progressing rural communities. The world needs farmers and farmers need plant science. CropLife International is proud to be at the heart of helping farmers grow.

CropLife INTERNATIONAL

Helping Farmers Grow