
APPENDIX B

HOW TO DEVELOP AN IPM PROGRAM

THE TWO PHASES OF IPM PROGRAM DEVELOPMENT

IPM program development generally occurs in two major phases: the start-up phase and the operational phase. The start-up phase involves educating key decision-makers about the need for the program, adopting an IPM policy and addressing administrative issues, and identifying the roles and responsibilities of the various members of the school community in operating a successful IPM program. The operational phase involves designing and implementing IPM programs for specific pests; training pest management, custodial, grounds maintenance, and nursing staff in IPM methods; and institutionalizing the IPM program.

START-UP PHASE

Educating key decision-makers

The stimulus for development of successful IPM programs in schools has come primarily from concerned parents. The key to success is educating the school board, superintendent, business operations manager, principals, PTA officers, and other decision-makers about potential problems with pesticide-based programs and presenting them with viable alternatives offered by the IPM approach.

Two publications are useful in this early phase: *Getting Pesticides out of Schools*, published by Northwest Coalition for Alternatives to Pesticides in Eugene, OR, and the booklet, *Pesticides in our Communities: Choices for Change*, a community action guide published by Concern, Inc., in Washington, D.C. (see the bibliography at the end of this chapter for details on where to obtain these publications). Box A summarizes twelve steps for pesticide use reduction in schools.

Adopting an IPM policy

Adoption of an IPM policy by the school board is key to starting an IPM program. A sample IPM policy is provided in Appendix C.

Identifying pest management roles and responsibilities

It is critical that representatives from all segments of the school community be involved in setting up the IPM

program from the beginning in order to foster their “buy-in” to the process and the program. This includes school board members, administrators and staff, teachers, students, parents, custodians, food service workers, ground maintenance personnel, school nurses, and pest control professionals. When the respective roles of all the people involved directly or indirectly with pests in the school system are identified and agreed upon, and when these people communicate well with each other, effective and less expensive protection of the site and the people can be achieved with reduced risk from pesticides. A discussion of roles and responsibilities is provided in Box B.

OPERATIONAL PHASE

The operational phase involves designing IPM programs for specific sites and pests, delivering IPM services, and evaluating program costs. Fully-developed, multi-tactic IPM programs are generally implemented in three stages, although components of each stage often overlap.

Stage 1 introduces monitoring and pest action thresholds to replace routine pesticide applications, and develops preliminary pest management objectives. Schools that have relied primarily on routine pesticide applications usually begin with a Stage 1 IPM program, and work up to a more complex stage as they develop experience and confidence in the IPM approach. Box C outlines tips for getting programs started.

Stage 2 formalizes pest management plans and maximizes pest-proofing, education, and non-chemical pest suppression. Stage 3 institutionalizes the IPM program.

STAGE 1 IPM

Stage 1 IPM focuses primarily on moving away from routine use of pesticides by instituting a pest monitoring program to collect data and establish pest treatment (action) thresholds based on pest population levels (see Chapters 2 and 3). A pilot program is initiated at one school site, so new skills can be gained and techniques fine-tuned before the program is expanded throughout the system.

Pesticides may remain the primary control agents used during this stage, but applications are made only when pest numbers reach action levels. Spot-treatments

Box A

STEPS TO SCHOOL PESTICIDE USE REDUCTION*

1. DO YOUR HOMEWORK
 - Find allies, network.
 - Develop a basic plan, establish goals (but remain flexible).
 - Compile information on hazardous pesticides and their alternatives.
 - Be prepared to answer statements countering your arguments.
 - Gather information on the organization of your school and school district (who's responsible for what).
 - Maintain records.
2. MEET WITH SCHOOL OFFICIALS
 - Determine the level of interest and cooperation for your pesticide reduction plan.
 - Schedule a meeting with those school representatives who need to be involved in a plan to reduce school pesticide use (safety officers, grounds keepers, school pest management personnel, etc.).
 - Bring allies and an agenda to your meeting.
 - Ask questions. For example, which pests are present? What chemicals are being used to control them? When and how often are pesticide applications done and by whom? Who makes the decisions about application. Are alternatives considered? What kind of records are kept? Is the school nurse trained to recognize pesticide poisoning?
 - Be friendly but insistent.
3. EVALUATE AND IDENTIFY STRATEGIES
 - Determine the level of cooperation you're likely to receive and develop a plan accordingly.
4. MEET WITH OR WRITE THE SUPERINTENDENT
 - Make him/her aware of your concerns.
5. DOCUMENT SCHOOL PESTICIDE USE
 - Include in your report
 - an introduction about the hazards of pesticide use in schools
 - the types, uses, and hazards of chemicals used in your district
 - basic recommendations for alternatives (hire an entomologist to do an on-site assessment!)
6. DEVELOP A SCHOOL IPM POLICY
 - Get your school board to develop a system-wide pesticide reduction policy.
 - Watch for soft language—policy wording that is open to interpretation can be used to justify spraying.
7. CONSIDER COSTS
 - Compare the costs of IPM and conventional pest control methods.
 - Remember to point out long-term budgetary issues.
8. EDUCATE AND ORGANIZE
 - Prepare a presentation for parent groups, student groups, school personnel, and other appropriate community groups.
 - Have a handout ready.
9. WORK WITH THE MEDIA
 - Define your message.
 - Get the word out in the community.
10. ADVOCATE FOR THE IPM POLICY
 - Lobby school board members. Gather petitions in support of the IPM policy.
 - Hold public meetings and have teacher's reps. and experts on health, the environment, and children ready to speak.
 - Include the media.
 - Be prepared to handle objections.
11. SELECT A COMMITTEE
 - Organize a pesticide use reduction committee to oversee developments and implementation.
12. CELEBRATE AND NETWORK

*Adapted from Taylor 1991

rather than area-wide applications are stressed, non-volatile baits and dusts are substituted for vaporizing sprays, and less-toxic soaps, oils, and microbial materials replace more toxic compounds.

At the same time, a planning process is established to set pest management objectives, identify the root causes of pest problems in the school system, and assess methods to address these causes with primarily non-chemical solutions.

STAGE 2 IPM

Stage 2 IPM involves a concerted effort to incorporate physical, mechanical, biological, and educational strategies and tactics into the pest management program, and to further reduce pesticide use.

Most pests found in school buildings can be attributed to faulty building design, lack of structural repairs, and poor food handling and waste management practices. To achieve permanent solutions to pest problems, pest

management staff must devote time to educating building maintenance and custodial staff, food handlers, and teachers and students about their role in attracting or sustaining pests, and enlisting their participation in solving the problems.

A similar process is needed to solve outdoor pest problems. For example, cooperation from physical education and coaching staff is needed to reduce stress on athletic

turf that leads to weed problems. Landscape maintenance staff need encouragement to locate pest-resistant plant materials, increase diversity in the plantings to attract natural enemies of pests, and experiment with non-chemical pest control methods. Assistance from playground supervisors is needed to insure that food debris and other wastes are placed inside waste receptacles where rats, yellowjackets, etc. cannot gain access to the wastes.

Box B

Identifying Pest Management Roles*

In successful school IPM programs, students, staff, parents, pest managers, and decision-makers all have important roles. These functions and responsibilities are identified below.

Students and Staff—The Occupants

Students and staff have a major role to play in keeping the school clean. Sanitation should not be viewed as only the custodian's job. If students and staff are shown the connection between food and garbage and pests such as cockroaches, ants, flies, and rodents, they are more likely to take sanitation measures seriously and comply with them. Rules for sanitation should be clear and succinct and they should be strictly enforced.

The Pest Manager

The pest manager is the person who observes and evaluates (or directs others to do so) the site and decides what needs to be done to achieve the pest management objectives. The pest manager designs an IPM program that takes into account potential liability, applicator and occupant safety, costs, effectiveness, environmental impacts, time required, and customer or occupant satisfaction.

The pest manager draws on knowledge gained through experience and prior training and uses information from the site and the pest and its biology. Since the pest manager usually has the responsibility of keeping both the occupants and the decision-makers (management) informed, he or she has the greatest need for information about the site, pest, and appropriate pest management methods.

The IPM program for the site must achieve the goals within the limitations posed by safety, time, money, and materials available. Pest managers monitor the site and the pest populations to

determine if actions taken are successful, and must keep accurate records of the amount and location of all treatments, including pesticides, dates of each treatment, and the level of effectiveness of the treatment.

Decision-Makers

Generally, persons who authorize the IPM program and control the money for pest management are people involved in the school administration, such as a Superintendent or Assistant Superintendent of Schools. However, a person indirectly involved with the site may become a pest management decision-maker, e.g., the Health Department Inspector. On other occasions, the purchasing agent or contracting officer for a school system or district may be a major decision-maker for a school site.

At this level of pest management decision-making, concerns about costs, liability, time expended, method effectiveness, safety, and customer or occupant satisfaction are foremost. Decision-makers also determine if the pest manager is performing at an acceptable level and if the pest management objectives are being met. This can be done by monitoring complaints from occupants, periodic evaluation and review of pest management strategy and effectiveness, observation of the site environment, inspections by external sources, or by a combination of these and other methods. Decision-makers must also provide the necessary level of financial commitment for any IPM program to succeed. With adoption of an IPM policy and use of model IPM contract language, there is less chance of error in communication between the different parties involved.

*Adapted from U.S. EPA 1993

The primary activities during this stage include developing site-specific pest management plans and educating all participants about their roles and responsibilities in helping to implement the plans.

Developing site-specific pest management plans

Written plans help move school pest control from a reactive system to a prevention-oriented system. Annual plans enable pest managers to prioritize use of resources, justify planned expenditures, provide accountability to IPM policies, and coordinate with other components of the school system.

These plans emphasize repairing buildings, changing waste management procedures to deny food, water, and shelter to indoor pests, and modifying plant materials and landscape maintenance practices to relieve plant stress and improve plant health.

Costs of these repairs and changes may fall within on-going operation expenses in existing budgets, or may require a one-time expenditure. In the long-term, however, these activities will reduce overall pest control costs as well as other maintenance and operating budget expenses.

Educating participants

Food service and custodial staff, clerical and administrative staff, teaching staff, and students must be educated about their role in reducing pest presence in order to enlist their cooperation.

Everyone must understand the basic concepts of IPM, who to contact with questions or problems, and their role as participants in the program. Specific instructions should be provided on what to do and what not to do.

Teachers and staff should be discouraged from bringing pesticides to school and applying them on school sites. Instead they should be provided with clear instructions on how and to whom to report a pest problem. One option is to provide teachers, etc., with “pest alert” cards on which they can write the date, location, and pest problem. The card can be returned to the teacher with a notation of what was (or will be) done about the problem and what, if any, assistance is requested of the teacher and students (e.g., better sanitation in the classroom, etc.).

If information on IPM can be woven into the current curriculum, students and teachers will better understand

their roles and responsibilities in the program, but more than this, students will carry these concepts into their adult lives. Education is the only way to make a significant, long-term impact on pesticide use in this country, and what better place to start than in schools? The following ideas are just a few of the ways that this information can be included in the school curriculum:

- involve science classes in identifying pests and in researching IPM strategies
- involve art classes and English classes in developing simple fact sheets and other educational materials on various school pests (use information from the pest by pest chapters in this manual)
- involve vocational classes in making site plans of the school to use for monitoring, in making site inspections for structural defects that may exacerbate pest problems, and in suggesting structural modifications to eliminate the problems
- involve journalism classes in reporting on the new IPM program
- use some of the innovative curricula available that emphasize IPM (see Appendix A for a list)

STAGE 3 IPM

Stage 3 IPM involves institutionalizing the IPM program. This includes developing on-going incentives and reward systems for achieving IPM objectives, establishing an IPM library of educational materials and staff training programs, and writing operations manuals that describe IPM policies and procedures to be followed by pest management personnel.

Develop incentives and rewards

Involve staff in establishing benchmark objectives (e.g., 20% pesticide reduction the first year, testing of boric acid in place of organophosphate roach sprays, raising of mowing height on turf to shade out weeds, etc.). Reward them for innovations and achieving objectives (e.g., a letter of commendation, recognition at a staff awards picnic, article in local news media, travel authorization to an out-of-town IPM conference, etc.).

Provide IPM educational materials and staff training programs

IPM programs are information-intensive rather than treatment-intensive. This necessitates motivating pest control staff to try new approaches and broaden their

Box C

Tips For Starting An IPM Program*

The following suggestions will help overcome barriers and smooth the transition to IPM implementation.

Mandate staff training in IPM. When writing the IPM policy document, include a requirement for the continuing education of pest management personnel. Ensure that budgetary allocations are made to assist them in obtaining the information, skills, and equipment they need to carry out the policy.

Start small. Begin IPM implementation in one location (e.g., a kitchen in a single school, a section of lawn at a single school, etc.) and include short-term objectives. For example, when dealing with a number of pest problems, identify one of the pests likely to respond quickly to an IPM approach, such as cockroaches, so a short-term objective can be realized. Test the IPM methods and fine-tune them. When the program is working successfully in one area, or against one pest, expand the program further.

Develop a list of resources. Know where you can go when information is needed, and know when you need to seek outside help. County Agricultural Extension personnel, teaching staff in the biology or entomology departments of a nearby university, staff at the local zoo, and even the high school biology teacher can help identify pests and their natural enemies. As you talk to these people ask them if they know of experts in your particular pest problem. You can slowly compile a list of people whom you can call for advice. Appendix G can be the beginning of your resource list. Always post your local poison control center telephone number in a prominent place.

Build a library for pest management personnel, staff, and students to use. Agricultural Extension publications are usually free or inexpensive and can be good sources of information on pest biology. Even though these publications do not always recommend the least-toxic approach, they are still useful. The recommended reading

section of this manual lists many useful books. Although some of these books are not in print anymore, you may be able to obtain them from your local library. If your library doesn't have the book you are looking for, ask if they can find the book in another, larger library and borrow it through an inter-library loan.

Don't change everything at once. To the degree possible, retain communication and accountability procedures already in use. Tailor new record keeping and reporting forms to fit existing agency formats. Recycle existing equipment to uses consistent with IPM methods rather than immediately eliminating the equipment.

Share the process. Involve all members of the student body and staff, especially pest management personnel, in the day-to-day IPM program process as early as possible so they will understand and support the program during the sometimes difficult transition period.

Emphasize communication and plan for future training. During the IPM transition period, keep all personnel informed about what is planned, what is happening now, the expected outcome, and what will happen next. Prepare written records and visual aids that will remain in the school when persons associated with development of the IPM program are no longer there.

Publicize the program. Develop good rapport with district public relations personnel and with the local news media. For interviews and photo sessions, include pest managers, custodians, and landscape maintenance personnel as well as principals, school board members, and the superintendent.

Involve the community. Form an IPM advisory committee composed of interested parents, school staff, community organizations, health specialists, and pest control professionals. They can help make IPM implementation a budgetary priority in the district, and can donate or locate resources that may not otherwise be available to the school.

*Adapted from Flint, et al. 1991

Box D

Sources of Pest Control Services*

IPM programs can be successfully implemented by “in-house” school employees, by contracting with a pest control company, or by mixing and matching these options to meet the needs and capabilities of the school system. All three approaches have advantages and disadvantages, and individual school systems must decide what is best for them under their unique circumstances. Whatever way you choose to implement your program, pest management personnel should be trained to

- understand the principles of IPM
- identify structural features or human practices that are contributing to pest infestations and know how to permanently improve them to reduce pest problems
- identify pests and recognize the signs or symptoms of their presence
- monitor infestation levels and keep records of pests and treatments
- know how to successfully apply physical, mechanical, cultural, and biological pest control methods
- know the full array of least-hazardous pesticides registered for use
- know recommended methods of judicious pesticide application
- know the hazards of pesticides and the safety precautions to be taken; be familiar with the pesticide label’s precautionary statement(s) pertaining to exposure to humans or animals

“In-House” Services

One of the most important tasks for an in-house program is training staff to function within an IPM

context. Universities and State Cooperative Extension Services have the expertise to meet most IPM training needs. Training materials that are needed and are not already available can be developed jointly between the School District, the Cooperative Extension Service, and other resource organizations (see Appendix G).

Contracted Services

Pest control companies should work with the responsible school official to solve pest control problems. Using an outside pest control company may cost more initially than in-house staff, but has the advantages of not having to hire and train personnel, or, when necessary, incur the added costs of storing pesticides. The contract should specify the use of IPM principles and practices in meeting pest management objectives.

When choosing a pest control firm, local Better Business Bureaus or state regulatory agencies may provide information about whether they have or have not received complaints about a pest control company. State regulatory agencies can also provide information on pesticide applicator certification.

The pest management services contract should include IPM specifications. Contracts should be written to provide expected results. Pest management objectives specific to the site should be jointly developed, agreed upon, and written into the contract. Any special health concerns (such as those for old or young persons, for pets, or for individuals who are allergic, etc.) should be noted and reflected in the pesticides that can be utilized, or excluded from use. See Appendix D for sample contract performance specifications.

*Adapted from U.S. EPA 1993

professional skills. Build an IPM library of literature and training videos, and provide release time for staff to attend training seminars or take courses in pest identification.

Prepare an IPM operations manual

Written policies and procedures are needed to insure clarity about responsibilities, authorized activities, permitted materials, and other program elements. A

manual serves as an accountability mechanism, and helps insure program continuity despite personnel changes.

A loose-leaf binder that allows for addition or deletion of materials over the years is a convenient format. In addition to official policies, procurement practices, etc., the manual should specify the following:

- pest management objectives
- the overall IPM process for managing each pest

- biological and ecological information on the pest and its natural enemies
- the monitoring system for each pest (and natural enemies when appropriate)
- injury levels and action thresholds for pests
- the record keeping system to be used
- how to interpret field data
- how to obtain, use, and maintain equipment and supplies required to carry out monitoring and treatment activities
- the range of treatment tactics authorized for use against the pest and how to employ them
- a list of pesticides authorized for use in the district
- safety procedures and resources for emergencies
- how to evaluate treatment effectiveness

BUILDING SUPPORT FOR THE IPM PROGRAM

Once an IPM policy has been adopted by a school board, it is up to the in-house pest control staff or outside contractors to implement the policy (see Box D for a discussion of pest control services and Appendix D for sample IPM contract specifications).

Change never comes easily, and there are a number of predictable obstacles within a school system—both psychological and institutional—to be overcome when initiating IPM programs. At the same time, even if the public has been involved with development of a policy, there are likely to be occasional complaints and controversies, especially as pests, pest control practices, and public concerns change.

PSYCHOLOGICAL BARRIERS TO IPM ADOPTION

Psychological resistance to change

The Problem

When pest control personnel are asked to make pest control decisions in a new way and to use new methods, they may feel that there is a negative implication regarding their past performance so they resist making the changes or drag their feet.

How to Address It

It is important to avoid an adversarial relationship with the school's personnel. If you want to secure their cooperation, you cannot think of them or portray them as "the bad guys." Pest control personnel will have information about current pests and pest control prac-

tices in the school as well as historical information that will be invaluable to you. Let them know that you consider their knowledge important and that you need their expertise in planning the implementation of the IPM program. Try to foster a sense of team spirit and point out that a pilot IPM program at your school could be used as a model for other schools in the district.

Loss of authority

The Problem

Adopting an IPM approach may engender fear of many kinds of loss, including loss of personal or supervisory authority. In the first case, individuals may fear that their experience in the field will become devalued, particularly if their expertise has been in pesticide application. In the second case, supervisors may fear that the system will become more efficient and they will lose positions beneath them.

How to Address It

Actually, successful IPM implementation enhances both personal and supervisory authority. Many of the new, less toxic pest control materials, such as pheromones, microbial and botanical pesticides, and insect growth regulators (IGRs) require the same or similar application skills and equipment as conventional pesticides. Mastering the techniques of monitoring, for example, enhances individual skills and can lead to an upgrading in job classification. In terms of supervisory authority, IPM programs provide managers with greater flexibility in staff assignments. For example, by emphasizing monitoring rather than prophylactic pesticide applications, staff time previously spent spraying can be redirected to other tasks, increasing overall productivity within a department.

Imagined difficulty in learning new technology

The Problem

The techniques used in IPM may initially appear to require conceptual and operational skills beyond those of the current staff.

How to Address It

This fear can be overcome by building staff training into the IPM implementation program, and by establishing a transition period during which pest management personnel experiment with and fine-tune IPM methods. Once personnel have a basic understanding of IPM concepts, these people will become the source of the most useful

innovations in pest management because they have the most extensive knowledge of how their system works.

Fear of IPM program failure

The Problem

Supervisory personnel may believe that the IPM program will not work for them even though it has been successful in a nearby school.

How to Address It

In fact, IPM programs are designed for the particular circumstances of each location. While the IPM decision-making process remains the same no matter what the pest or site, the specific tactics and products used may vary greatly from one location or circumstance to another. This flexibility usually assures an appropriate solution to the pest problem.

INSTITUTIONAL BARRIERS TO IPM ADOPTION

Fear that IPM means no access to pesticides

The Problem

Some people think IPM means never using chemical controls.

How to Address It

While IPM definitely encourages alternatives to pesticides when feasible, chemical controls are used when necessary. However, in an IPM program, pesticides that are least-disruptive, most-selective to specific pests, and rapidly biodegrade are preferred over common, broad-spectrum materials. When chemical controls are used in an IPM program, every effort is made to “spot-treat” specific areas rather than spraying large areas.

Fears that IPM is more expensive than traditional pest control

The Problem

Until agencies have experience with IPM, they expect it to cost more than their current program.

How to Address It

While there are short-term start-up costs for any new technology, in the long run IPM has usually proven more cost-effective than a strictly chemical control program. When possible, IPM programs substitute information gathering (monitoring) in place of other pest

control activities, such as preventive pesticide applications. This can be very cost-effective. For example, by monitoring their 1100 elm trees rather than prophylactically spraying them against elm leaf beetles, the City of San Rafael, CA found that only a small portion of the trees required treatment. As a result, the city saved \$1400 (including monitoring costs) in the first year of its IPM program, compared to the previous year when all trees were sprayed.

IPM methods emphasize reducing the source of pest problems (e.g., designing out pest habitat and food sources) rather than treating symptoms (e.g., spraying). This type of pest prevention program is more cost-effective than a continuing program of pest reduction that does not address the underlying cause of the infestation and is therefore repeated again and again. For example, by permanently reducing habitats for rats (i.e., by filling rat holes with concrete, changing the design of garbage cans, and increasing frequency of garbage pickup) the National Park Service was able to permanently reduce rat populations in certain parks. Previous rat control programs that had relied on poison baits had not been successful despite large expenditures of labor and money.

Lack of in-house IPM expertise

The Problem

School staff may be unfamiliar with IPM and may not know where to go for information.

How to Address It

While it is true that IPM education and training resources are not as widely available as those for chemical controls alone, good resources can be found in any community. Many agencies have found it feasible to hire an IPM specialist to work as a consultant to in-house pest control staff during the initial year or two of IPM implementation, or to create an IPM coordinator position and recruit nationwide. Other sources of information include cooperative extension agents, college horticultural or entomological faculty, and pest control advisors. Periodicals providing practical technical advice on IPM methods for specific pest problems are increasingly available. See also the Recommended Readings section of this manual and Appendix G. Box E provides names and addresses of contacts who can help with questions of IPM program design and implementation.

Box E

Contacts to Help Implement an IPM Program

Tim Rhay Consulting
916 Corydon St.
Eugene, OR 97401
(541) 345-8006

Tim Rhay has been instrumental in developing and maintaining the IPM program for Eugene, OR, which has been a huge success. He is involved in doing presentations to pest control professionals, maintenance workers, and various state government workers. He operates a limited consulting business in IPM implementation, especially for athletic turf maintenance.

Mike Raup—(301) 405-3912
John Davidson—(301) 405-3927
Lee Hellman—(301) 405-3920
Department of Entomology
University of Maryland, College Park, MD 20742

All three have been part of a team of entomologists working for many years on implementing IPM programs in various environments. They have been involved in establishing demonstration homeowner sites; in working with commercial landscape professionals (where switching to IPM resulted in a 93% reduction in pesticide use), in nurseries and greenhouses, and in institutional settings. They have published reports on each of the programs they have implemented, including data on pesticide use reduction.

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