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Reform of Pesticide Regulations

Helping Farmers Shift to Biointensive IPM

Developing countries should create a registration process that will make it easier to introduce new zero- and low-risk pest management inputs, thus giving farmers alternatives to more dangerous broad spectrum poisons.

The term 'biointensive integrated pest management (IPM)' describes heavy, but not exclusive, dependence on biologically-based pest management techniques and inputs, with some use of conventional chemical pesticides. Low-risk inputs for biointensive IPM include pheromones (sex scents to disrupt insect mating), innoculants (to stimulate plant immunity to disease), insect and plant growth regulators, viruses and bacteria that attack insect pests, and insect predators and parasites. There is, however, no simple correlation between risk and biological source — some biopesticides are high risk (for example, rotenone), and some low-risk inputs are inorganic (such as plastic films).

This Note uses the term 'biointensive IPM' to avoid ambiguity. IPM may, for example, refer to pesticide application rules or rotation schemes designed to delay emergence of pesticide resistance. Success with such rules ensures continued effectiveness and use of conventional pesticides with attendant risks for the environment and public health. This Note is based on a recent UNDP-World Bank publication (Gisselquist and Benbrook, 1996).

Commitment to IPM

The World Bank's *Operational Manual*, (1993b, 1996) promotes IPM to limit public health and environmental risks from pesticide use. The overall strategy is to raise barriers for more dangerous pesticides (for example, higher prices and tighter regulations), while lowering barriers for safer alternative technologies (such as reasonable registration processes, research, training, and extension).

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Groundnut farmers in some regions of south India provide perches for predatory birds that eat crop-destroying insects. Birds have returned to these fields as pesticide applications have stopped or been severely reduced. Farmers have the option of reducing the effects of insect outbreaks (now rare) with sprays of insect viruses. Birds eat insects infested with the virus, and their droppings help spread it.

An earlier *Agriculture Technology Note* (No. 2) describes the Bank's commitment to IPM, and advises support for public research, extension, and training to help farmers limit use of chemical poisons and shift to low-risk inputs and techniques. This earlier Note, however, overlooks an important element of the Bank's IPM strategy — encouraging the introduction of new and less harmful pesticides through legislation establishing a streamlined and accessible pesticide registration process that does not impose heavy costs (*World Bank*, 1993b, part II, para 20).

Success with Biointensive IPM

When agricultural development is successful, farmers achieve higher yields with new crop varieties, more efficient use of fertilizer, and other improved technologies. But raising yields often increases pressure from pests — if only conventional pesticides are available, environmental and public health damages increase, no matter how intense the efforts to tighten regulatory systems. On the other hand, if sufficient inputs and advice for biointensive IPM are available, modernizing farmers can boost yields and contain pest damage without draconian environmental and public health trade-offs.

Farmers in many developing countries have demonstrated success with biointensive IPM for selected crops. For example, farmers in Brazil use a virus collected from diseased velvet bean caterpillars to control that pest on nearly one million hectares of soybeans. In Cuba, the government has aggressively and successfully promoted production of microbial pesticides (viruses and bacteria that attack pests). Peru and Columbia have been leaders in developing ecological methods of pest control, including on-farm rearing and release of pest parasites and predators.

For selected crops and countries, donors have provided crucial support for introduction of biointensive IPM. For example, the government of Indonesia, with advice and

support from FAO and other donors, has banned use of many pesticides on rice, and trained farmers to manage pests largely without chemicals. In Africa, the International Institute for Tropical Agriculture worked with governments to introduce a parasitic wasp from South America to control the cassava mealy bug.

Farmer Access to Inputs

Pesticide regulatory systems often obstruct incentives and efforts by the private sector and NGOs to identify and introduce new inputs that could allow farmers to shift to biointensive IPM. Virtually all governments maintain lists of approved (registered) pesticide products, and those that are not registered cannot be sold. Registration may or may not be coupled with recommendations for use based on official field tests.

Pesticide registration systems in many countries, including most developing countries, treat all pest management products alike, forcing low- or zero-risk products such as pheromones to go through the same tests and controls as conventional high-risk poisons. The standard legal definition for 'pesticides' covers all chemical and microbiological pest control inputs, whether or not they are poisons or have any negative environmental or public health effects, along with plant growth regulators (FAO, 1985, p. 6).

Regulatory systems, however, are beginning to change to favor safer pesticides. In OECD countries, public pressure to reduce pesticide damage has brought regulatory changes that are raising the cost of registering conventional pesticides while reducing the time and expense to move biological and other low-risk pesticides through the regulatory process. This streamlining creates incentives for research and product development to focus on biopesticides and other low-risk products, and has had notable results. In the U.S., for example, just over half of the 40 new active ingredients that the Environmental Protection Agency registered in fiscal 1995 were biopesticides, and dozens of new products and technologies are in various stages of development.

While much of this new low-risk technology will also be suitable for use in developing countries, farmers in such countries may not find them available or affordable if current regulatory systems and pest management policies continue without reform.

Favoring Biointensive IPM

Reduce Costs to Register New Biopesticides. Even though most new products seeking registration in a developing country have already passed rigorous registration processes in developed countries, registration in a developing country may take an additional three to five years, along with fees for tests and registration. In a developing country, multi-year, in-country efficacy (performance) tests account for most of the time and money necessary to register a new pesticide. Most developing countries require efficacy tests for all pesticides, even those with zero or low risks, but standard efficacy tests are designed for conventional pesticides and are not appropriate for biopesticides, which are typically designed to alter pest behavior and physiology in ways that reduce pest damage rather than directly kill target pests. For environmental and public health risks, however, developing countries generally accept data from registration tests in developed countries.

Low-risk products for biointensive IPM characteristically target specific pests, and consequently have lower potential sales compared to broad spectrum poisons. In developing countries, where markets are typically limited, potential sales for biopesticides may be too small to justify spending more than a nominal amount of time and money to obtain required registrations. When companies judge that costs and uncertainty make registration not worth the effort, farmers have no opportunity to buy products.

Sales of conventional pesticides are large enough even in small markets to provide sufficient incentives for pesticide companies to spend the time and money to register their products, but in small and even medium-sized developing countries, annual sales of low-risk biopesticides can be too small for companies to bother with the registration processes (see table, below).

Recommendations 1-3 (see box, p. 3) urge governments to exempt zero or very low-risk pesticides from registration, arrange automatic registration, or base decisions to register exclusively on risk data, leaving efficacy for markets to evaluate. Public (and private) organizations would normally continue to test products for efficacy to develop optimal guidelines for use, but these tests would not be a part of the registration process and would often follow registration.

These recommendations are similar to ongoing reforms in several OECD countries and are also consistent with standard market principles — governments do not need to regulate a product unless there is evidence of market failure. Reforms consistent with Recommendations 1-3 include:

- de-regulating pheromones and other virtually non-toxic pest controls such as pepper, soaps, and vegetable oils; and

Pesticide sales in small, medium, and large markets

Sales in markets of different sizes (US$)

Pesticide products	Small (e.g., Haiti, Malawi, Nepal)	Medium (e.g., Kenya, Nicaragua, Sri Lanka)	Large (e.g., Brazil, China, Indonesia)
All pesticides (actual imports or sales)	1.2-5.0 million	18-45 million	120-1,000 million
Hypothetical conventional product (sales calculated as 5% of all pesticides sales)	60,000-250,000	1.1-2.3 million	6-50 million
Hypothetical biopesticide (sales calculated as 0.01% of all pesticide sales)	120-500	1,800-4,500	12,000-100,000

Source: Data on actual values of pesticide imports for 1993 (Haiti, Malawi, Nepal, and Kenya) or sales for 1988 (Nicaragua, Sri Lanka, Brazil, China, and Indonesia) are from FAO (1993) and Jackson (1992).

Regulatory changes to favor biointensive IPM

Improving farmer access to inputs for biointensive IPM

1. For pesticides with zero or very low risk, either exempt from registration or mandate automatic registration. Sufficient information on risk is generated for registration in major developed countries and is available.
2. For biopesticides and other low-risk pesticides for agriculture, base registration exclusively on risk. However, for pesticides used in public health programs, efficacy should be considered.
3. In small and poor developing countries in particular, ease registration processes sufficiently to allow traders to import and introduce low-risk pesticides with potential annual sales of no more than several hundred dollars.

Reducing incentives to continue with older high-risk conventional pesticides

4. For old and off-patent pesticides with at least one approved brand, establish a clear policy for quick registration of competing brands of approved formulations, subject only to laboratory tests to show that new brands meet objective quality standards.
5. Maintain liberal pesticide trade policies, avoiding any bias for domestically produced active ingredients. Since markets for many low-risk biopesticides are low volume, much of the new technology is only available from imports.
6. Tax pesticides, with rates varying across formulations as a function of risk, so that prices to farmers reflect total social costs (including externalities).

Enlisting consumers in favor of biointensive IPM

7. Set maximum residue limits, test food and feed in domestic markets, and publish results.

- agreeing to accept registration decisions by any OECD country or neighboring country for non-toxic agricultural biopesticides, including pheromones and plant and insect growth regulators.

Cut Incentives that Favor Conventional Pesticides. If policies are to offer accurate signals about the social costs of alternative pest management technologies, then another challenge is to reduce incentives to continue with older and more dangerous conventional pesticides. Many of these are off-patent, so that multiple brands of the same formulation compete in world trade. Nevertheless, regulators in developing countries often limit market access to one or a few brands for popular formulations, delivering large profits to favored companies. Indonesia, for example, restricts the number of registration holders to three for each active ingredient (Jackson, 1992, section 4.4.4).

Large profits on conventional pesticides — generated in part from restraints on trade through the pesticide registration process — create co-dependence between vendors and regulators. Recommendation 4 asks governments of developing countries to register competing brands of off-patent pesticides to reduce profits and incentives for older conventional pesticides.

To the extent that developing countries no longer protect unnecessary monopolies for old products, multinational research-based pesticide companies will lose sales of older and more dangerous pesticides to competing lower-cost producers. Suggested reforms may encourage research-based companies to shift to newer and safer products for developing as well as developed countries.

Another common source of bias favoring older and high-risk products is government policies that favor domestic production over imports. In India, for example, where government encourages local pesticide production, "the introduction of new pesticides, developed elsewhere, is made difficult," leaving farmers with "the older generation of pesticides which the Indian industry is mainly producing" (Jackson, 1992, section 4.3.5.3). Recommendation 5 asks for an end to trade and other policy biases that favor domestic over imported active ingredients.

Taken alone, Recommendations 4 and 5 would cut retail prices for conventional pesticides by fostering competition. Since private costs do not reflect total social costs, Recommendation 6 proposes taxes to give farmers correct signals about social costs. Governments could assess differential fees and taxes according to environmental and public health risks, with zero taxes on the least dangerous products, and up to 100 percent on more dangerous products that are not banned.

Bring Consumers into Pesticide Policy Debates. If developing countries are to generate sufficient political will to shift from current high-risk pest management systems to low-risk ones, consumers will be an essential part of the equation. One way to bring consumers into the public policy debate about pesticides is to provide them with more information about the health consequences of pesticide residues in food. Currently, most developing countries have little or no residue testing, except for vegetables and fruits that are exported to developed countries.

The limited information available on pesticide residues in developing countries suggests serious problems, at least for some products, markets, and regions. For example, recent residue tests in India found "DDT residues [that] exceeded the Codex MRL [maximum residue limit] in about 10% of the cereals, 60% of the bovine milk, and 66% of the butter samples" (Kannan *et al.*, 1992). Overall, consumers in India are exposed to residue levels several times greater than those in Europe, the United States, or Japan.

Even with aggressive programs to restrict and ban high-risk conventional pesticides, many dangerous poisons will continue to be approved for non-food crops and public health uses such as mosquito eradication. Without residue testing, there is no way to measure or address the risk that farmers will divert dangerous pesticides for use on food crops.

Even in situations where food is homegrown or traded through local markets, residue testing can provide the public with

information they need to improve the safety of their food supply. For example, a government could test samples of fresh vegetables from a town market (without trying to link samples to a particular farmer or trader), then publicly announce results to stimulate community pressure for safe pesticide use.

Promoting Biopesticides

Recommendations in this Note are proposed as a common strategy for diverse interests to promote biointensive IPM:

- environmentalists want to limit damage from conventional pesticides;
- farmers want safe, effective, and low-cost pest management technologies;
- companies offering biopesticides want lower regulatory costs and higher net profits; and
- consumers want safer food.

Recommendations are not intended to be a complete agenda for any group, but identifying and focusing on areas of agreement may allow an alliance to achieve meaningful reforms.

Multiple Channels for Research and Dissemination. Reforms recommended in this Note support autonomous private efforts to promote low-risk pest management. For example, reforms could make it easier for NGOs promoting organic agriculture for high-value export crops to import and introduce inputs from other countries where organic agriculture is more advanced (for example, farmers in Central America could use inputs from California).

A larger role for private and NGO research and extension does not imply rejection of government research and extension programs —it is not a choice between public and private organizations. Since pest management technologies often involve large positive or negative externalities, public research and extension can improve social welfare by promoting selected technologies. For example, classic biological control can achieve effectively permanent control of some pests at no cost to farmers. Strong arguments can be made for more research on low-risk pest management in specialized institutes such as the International Institute of Biological Control and the International Centre of Insect Physiology and Ecology, as well as through the centers of the Consultative Group on International Agricultural Research and national agricultural research systems (NARS).

Implications for Donors. Stories of successful efforts by the World Bank, NARS, or extension agencies to introduce low-risk IPM for a specific country and crop are encouraging. While important, widely heralded successes can mask the enormous scope of the challenges ahead. Even long lists of successful projects do not penetrate to the heart of the challenge. If every specific success with biointensive IPM depended on international debate and support from Washington, Rome, or other donor capital, then low-risk pest management would have a dim future in developing countries.

Donors can help not only by funding and offering advice for public sector research and extension programs, but also by policy advice for governments to ease regulatory obstacles to private technology transfer. Policy changes that facilitate independent initiatives by a wide range of autonomous public and private institutions can be expected to vastly improve farmer access to low-risk pesticides and advice for biointensive IPM systems. Donors can also help by channeling some of their aid resources through university consortia, NGOs, and other organizations, thus directly supporting multiple channels for initiative and technology transfer.

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