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PEST MANAGEMENT AND FOOD PRODUCTION: LOOKING TO THE FUTURE

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The supply of food—especially grains—in developing countries will have to rise by around 70 percent by 2020 if the 6.5 billion people who are expected to be living there are going to be food secure. Nearly all of this increase in food supply is expected to come from developing countries themselves. Meeting this projected increase will require both a sustained rise in yields of the major grains and legumes and reduction in crop losses due to pests.

Because opportunities for expanding irrigation and productive arable land are limited, future strategies will have to focus on raising the productivity of available land and water resources. There could hardly be a less efficient use of these resources than to invest time, money, and effort in producing food only to have it totally or partially destroyed by pests (see table). Depending on the levels of losses and costs involved, improved pest management would seem to be an important strategic component for increasing available supplies of food in developing countries.

A LACK OF ADEQUATE DATA

A serious drawback to formulating a strategy for improving pest management is the inadequate state of knowledge about actual losses from pests and the real and potential gains from pest management. If overall losses from pests are as high as 50 percent, as some researchers have indicated, then governments and organizations such as the World Bank and the Consultative Group on International Agricultural Research (CGIAR) may well need to devote more resources to reducing losses. But if losses from pests are much lower, maybe 10–15 percent, as other researchers claim, then it may well be appropriate to give a lesser priority to pest control relative to other investments in agricultural development.

Actual production and estimated losses for eight crops during 1988-90, by

Region	production	Pathogens	Weeds
	13.3	4.4	12.8
	50.5	7.5	22.9
	30.7	7.6	21.7
	162.9	57.6	145.2
	42.6	6.1	16.8
	31.9	7.0	22.1
	3.3	0.6	1.9

Crop production and crop protection: Estimated losses in major food and cash
(Amsterdam: Elsevier, 1995).

crop losses will require the development of appropriate methodologies as well as covering a reasonable period of time. A data bank could help establish the costs and benefits of pest management make it important that any such international body, such as the Food and Agriculture Organization of the United security.

The use of chemical pesticides is and will continue to be important for reducing US\$30 billion a year, and about 80 percent of the pesticides in use are applied in apace as developing countries intensify crop production to meet national needs. rapid growth in use in the past: the emphasis on "chemical" solutions to the aggressive salesmanship of the distributors of pesticides; the near absence of developing countries; and increased pest resistance in plants, leading to ever

There is continuing controversy over the extent of the harmful side effects of the effective pressure from environmental groups has led to tighter regulation of developed countries. As a result, the major transnational corporations that persistent, narrow-spectrum products to conform to the stricter regulatory

These newer, costlier, improved products have to compete in developing countries nontargeted pesticides that contain hazardous compounds banned in developed

countries. They may also be banned in developing countries, but, in the absence of strong environmental movements and “green” political parties, the enforcement of these regulations is extremely lax.

INTEGRATED PEST MANAGEMENT (IPM)

Promoting IPM would be one way of reducing chemical pesticide use. At present, 20 years or more after the introduction of the concept in the United States, there is still no universally accepted definition of IPM. Some see IPM as part of a broad-based approach that leads to a “chemical-free” agriculture, while others see it as a system that involves the most efficient use of chemical pesticides. All agree though that IPM calls for a much greater reliance on nonchemical approaches to pest management.

Given the current reliance on chemical pesticides, along with the uncertainties about many nonchemical approaches, it is unlikely that there will be pesticide-free agriculture over the next several decades. Rather, it is highly probable that the forms of IPM that will be encouraged will include a greater reliance on biological approaches and the judicious use of some chemical pesticides. Greater attention will be paid to applying the right quantities of pesticides at the appropriate times and safeguarding the natural enemies of pests. At the same time, IPM will also incorporate the use of crop rotations and pest-resistant varieties of crops.

Policies that support IPM will include removing the existing biases that encourage pesticide use (such as subsidizing pesticides). In addition, public sector research and development will have to focus on the most effective farming systems consistent with IPM. Above all, though, governments will have to commit themselves to promoting IPM, supporting the very substantial educational efforts required to persuade millions of producers to modify their approaches to pest management, developing appropriate methodologies, and teaching IPM’s knowledge-intensive practices.

BIOTECHNOLOGY

Another important issue regarding pest management in the future centers on the role of biotechnology in crop production. The next 20 years will see a substantial increase in the use of genetically engineered plants. Some of these plants have been engineered so that the application of herbicides will destroy weeds but not the economic crop. Other genetically engineered plants have been designed to resist pests such as stem borers and nematodes without the need for pesticides. Others are expected to combine both herbicide resistance and insect resistance in one seed.

The overall effects on pesticide use remain to be seen. It is probable that the use of herbicides may expand while the use of certain insecticides may diminish. There are concerns, however, that the rapid diffusion of improved varieties may well lead to pest resistance, including the possible transfer of genetic qualities from modified plants to weeds, creating new generations of weeds resistant to herbicides. There are also concerns about the long-term effects of increased consumption of genetically altered materials on both humans and animals.

OPTIONS FOR DEVELOPING COUNTRIES

The new technologies have been developed in North America and Europe by the private sector. Developing countries will have a limited number of options if they wish to take advantage of any opportunities afforded by biotechnological research. One option is for the larger, more advanced countries to invest in domestic biotechnology research suited to national circumstances.

Another option would be to “leapfrog” the technological gap by arranging to share

new technologies with the corporations that own the rights to these technologies. This would involve some form of partnership between either the public or private

But technology and new-product transfers may well hinge on legal codes in developing countries that recognize the sanctity of patents and intellectual property

THE ROLE OF THE PRIVATE SECTOR

The private sector will be the driving force in research and development regarding

use of industry products continue to be of concern when the production of socially acceptable products raises costs and lowers profits. Thus, an important issue

encouraging trans-national corporations to produce agricultural inputs that lessen harmful side effects without leading to a decline in output. Attaining this outcome

sector by encouraging public-private partnerships for specific product development. Efforts can be made to encourage corporations to adopt significant

develop and enforce an international code to govern the development and distribution of new products. Failing this, the governments of both developed and

CONCLUSIONS

Policymakers interested in effective crop protection have to balance the social

losses is required. Options for improving pest management include the development of pesticides that are more benign than current products. IPM

support IPM but also regulate hazardous pesticide use. Genetically engineered crops offer great promise but need to be monitored. Developing countries will have

with corporations. Finally, ways to encourage corporate responsibility will have to be addressed.

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initiative of the International Food Policy Research Institute (IFPRI) to develop a shared vision and a consensus for action on how to meet

environment. Through the 2020 Vision initiative, IFPRI is bringing together divergent schools of thought on these issues, generating *2020 Briefs* present information on various aspects of

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