Insect Sci. Applic. Vol. 5, No. 3, pp. 151–155, 1984
Printed in Great Britain.

0191-9040/84 $3.00 + 0.00

(3)

GOVERNMENT INFLUENCE ON PESTICIDE USE IN DEVELOPING COUNTRIES

DALE G. BOTTRELL
University of California, Berkeley, Consortium for International Crop Protection, 2288 Fulton Street, Suite 310, Berkeley, CA 94704, U.S.A.

(*Received* 7 *June* 1983)

Abstract—Chemical pesticide technology has spread much more quickly in the developing world than has the capability to ensure its effective and safe use. Use of pesticides in developing countries is rapidly increasing, and pesticide exporters from the industrialized nations are increasing their sales to the developing countries. Many pesticides considered too dangerous for unrestricted use in the western nations are being exported from these nations to the developing world. Yet under current law it is perfectly legal for companies to export them. Some developing countries have not enacted legislation to govern the importation, domestic use and disposal of these or other pesticide materials. Even with the laws, the governments frequently lack the infrastructures required to enforce them. Further, the developing countries seldom have the medical personnel and facilities required for diagnosing and treating cases of pesticide poisoning, and programmes to train farmers on the correct use of pesticides and alternative methods are often inadequate.

This paper discusses ways that governments at national and international levels influence the spread and use of pesticides in the developing countries through legal action, policies on export and import, aid, research and extension, pest control programmes, and other means.

Key Words: Pesticides, governments, developing countries, pesticide exports, pesticide laws, pesticide imports, integrated pest management

INTRODUCTION

Through legal action, policies on export and import, aid, research and training, pest control programmes, and other means, governments influence the types and quantities of pesticides that are used in the developing countries. A developing country's own laws, regulations and enforcement procedures, and government-sponsored programmes in pest control research, extension and implementation, influence pesticide use. This use is further influenced by government export policies of countries that supply the pesticides, by donor governments that provide aid and technical assistance, and international government-sponsored research and extension programmes.

This paper discusses ways that governments at national and international levels influence the spread and use of pesticides in the developing countries. The publications by Motooka (1976), USDS/USNCMB (1979), Weir and Schapiro (1981) and Bull (1982) are recommended for a more comprehensive treatment of the subject.

PESTICIDE USE IN THE DEVELOPING COUNTRIES: STATUS AND TRENDS

There is presently no way to determine accurately the amount of pesticide consumed annually by the developing countries, but available estimates indicate that it would not exceed about 15% of the amount consumed worldwide (Bull, 1982). Some developing areas use very small quantities; heavy use has become a way of life in others, especially where large plantings of cash crops (cotton, coffee, cacao, banana, sugar-cane, etc.) are grown or where high yielding varieties of cereal grains or vegetables have been introduced. Trends indicate that overall use of pesticides in the developing world is rapidly increasing. In Africa, for example, pesticide use will more than quintuple during the decade ending in 1984, according to the estimates of GAO (1979).

As pesticide consumption in the developing world increases so does the export of pesticides from the industrialized nations. Pesticide exports from the U.S.A. have nearly doubled since 1965 (Ayres, 1978), although U.S. exports still account for only about 16.5% of the world pesticide export market. The European Economic Community (including the U.K.) is the major exporter, accounting for 61.5% of this market (UN, 1978). A significant portion of the western nations' exports of pesticides are directed to the developing world. For example, 49% of the pesticides exported from the U.K. in 1979 went to the developing countries (Bull, 1982). Pesticide exports from the U.S.A. account for 50% of total domestic pesticide production (Ayres, 1978).

Many pesticides considered too dangerous for unrestricted use in the western nations are being exported from these nations to countries of the developing world. About 25% of all pesticides exported from the U.S.A. are heavily restricted compounds or compounds that have been suspended or prohibited from use there (GAO, 1979). A significant portion of them may end up in the developing countries. They include highly toxic insecticides such as aldicarb, methyl parathion and carbofuran and persistent chlorinated hydrocarbons such as DDT.

Many non-western nations are also in the pesticide export business. Newly developed nations with emerging pesticide industries are likely to become important exporters in future.

INFLUENCE OF GOVERNMENT IMPORT AND EXPORT POLICIES

The ability to regulate pesticide imports varies considerably among countries of the developing world. Table 1 illustrates the great variation in pesticide legislation and regulatory and enforcement procedures that exists even among neighbouring countries of the Caribbean.

Based on information supplied by Bull (1982), probably less than half of the world's developing countries have enacted legislation to regulate the import, use and disposal of pesticides. A number of countries have pesticide laws on their books, but no means of effectively enforcing them (Whittemore *et al.*, 1982).

This lack of effective control in many developing countries adds to the moral responsibility of the pesticide exporting nations (Bull, 1982). Yet under current law it is perfectly legal for companies to export pesticide products that are banned, heavily restricted, or have never been registered in their own countries.

In recent years, the U.S. Government, largely because of pressure from non-government organizations, has taken steps to improve its policies on pesticide exports (Bull, 1982). Although the U.S. law cannot stop companies from exporting unregistered pesticides, the Environmental Protection Agency (EPA), the national pesticide regulatory agency in the U.S.A., developed a new "notification" regulation in 1979 that requires U.S. exporters to inform foreign buyers of the known dangers of these materials. An exporter is required to send the buyer a statement disclosing whether a pesticide is unregistered or whether its registration has been cancelled. The importer must acknowledge to the EPA that this notification has been received. The EPA then sends the acknowledgement to the State Department, which forwards the information to the appropriate official in the importing country.

The EPA is also required to notify foreign governments why it will not register a particular pesticide in the U.S.A. The purpose of the notification is to help the foreign country decide whether it is willing to take the risks associated with importing a particular chemical. But the programme has certain weaknesses, as discussed by Gitonga (1979) and Weir and Schapiro (1981). Most critical, it has no provisions for enforcement.

On 15 January 1981, five days before he left office, President Jimmy Carter issued the "Executive Order on Federal Policy Regarding the Export of Banned or Significantly Restricted Substances" which would have been an important step in controlling the export of dangerous pesticides. However, on 17 February 1981, President Ronald Reagan revoked the Executive Order. Bull (1982) reviewed other recent developments concerning export policies in the U.S.A., U.K. and Western Europe.

After export to a developing country, pesticides are often repackaged, relabelled or even reformulated by distributors. Thus, even an effective export policy on the part of an exporting nation may be of little value to the recipient country. Unless the importing nation has testing facilities and sufficient institutional expertise in monitoring, handling, storage and use, the potential for improper use remains high. (USDS/USNCMB, 1979).

INFLUENCE OF DEVELOPING COUNTRY REGULATIONS

As noted above, the pesticide regulatory and enforcement procedures vary considerably among countries of the developing world. Even though many developing countries have pesticide laws, enforcement procedures on the distribution, use and disposal of pesticides are generally ineffective, as discussed by Bull (1982). The farmers and workers are often not properly prepared to handle even those pesticides that are considered relatively safe when in the hands of informed users. Often, they cannot read or understand the pesticide labels, or they use the pesticide materials from unlabelled containers. They rarely possess (or wear) protective clothing or safety devices, and sometimes carelessly dispose of the left-

Table 1. Status of pesticide legislation and regulations and enforcement procedures in some Caribbean countries, 1981 (after Whittemore *et al.*, 1982)

Country	Pesticide legislation		Regulations and enforcement procedures			
	Enacted	Not enacted	None	Drafted or being drafted	Promulgated	Partial or complete enforcement
Antigua		×		×		
Bahamas		×	×			
Barbados	×					×
Belize		×		×		
Dominica	×				×	
Dominican Republic	×					×
Grenada	×					×
Guyana		×		×		
Haiti		×	×			
Jamaica	×		×			
St Kitts-Nevis	×				×	
St Lucia	×				×	
St Vincent	×			×		
Trinidad and Tobago	×			×		

over materials. Further, the developing countries seldom have the medical personnel and facilities required for diagnosing and treating cases of pesticide poisoning, and their extension efforts to train farmers on the correct use of pesticides are often limited.

In 1969, the Food and Agriculture Organization of the United Nations (FAO) developed guidelines for the development of pesticide legislation in the developing countries. Despite their age, the "Guidelines Concerning the Sale and Marketing of Pesticides" are still important as a general reference for the development of pesticide laws for these countries (Whittemore *et al.*, 1982).

However, existence of a pesticide law without accompanying regulations and enforcement procedures, and personnel to carry them out, is of little value. Many third world countries simply lack the personnel required to develop the regulations and ensure their enforcement.

INFLUENCE OF THIRD WORLD GOVERNMENT PEST CONTROL PROGRAMMES

National, state and local governments in the developing countries, and also quasi-government organizations such as agricultural commodity boards, carry out a broad range of pest control programmes that use pesticides. Many of these programmes are aimed at controlling pests on facilities and land owned or managed by government agencies. Mosquito abatement programmes and locust survey and suppression programmes run by government employees are other examples.

In some developing areas, government agencies or quasi-government organisations may actually manage all of the pest control operations carried out in the farmers' fields. These operations may be run by national plant protection services, or they may be carried out cooperatively by national, state and local plant protection services. In some areas, the plant protection services are in charge of pest control operations in the farmers' fields. The services supply all of the pesticides, often at no cost to the farmers, make all the decisions concerning need for treating, and carry out the treating. The farmers may not even participate in these operations. In other areas, government services or quasi-government organizations may not engage in the field operations, but they decide when and what pesticides to apply and may even supply the pesticides or subsidize part of the treating operation. Fully- or partially-subsidized pest control programmes run by governments are found in many developing countries. The developing countries may provide the subsidies or, as discussed below, the subsidies (and pesticides) may originate from outside donors. Whatever the source of funding, these subsidized programmes contribute significantly to pesticide use in some areas of the developing world.

INFLUENCE OF DONOR GOVERNMENTS

Most developed countries carry out assistance programmes in the developing countries. These programmes frequently require the use of pesticides for the control of pests that affect agriculture and public health. However, donor financing accounts for only some 6% of the total quantity of pesticides used in the developing countries (Freed, 1979).

Pesticides used in the assistance programmes are usually imported from the donor country. A given developing country may receive aid and technical assistance from a variety of donors, and the donors may all have different policies and procedures concerning the use of pesticides. All of these policies and procedures influence the kinds and quantities of pesticides that are used in the host country.

The U.S. government's policy on pesticide use in foreign assistance programmes has changed drastically in recent years, as discussed by Scherr (1979) and Bull (1982). The U.S. Agency for International Development (AID) financed overseas shipment of banned, unregistered and highly restricted pesticides until a lawsuit brought by four U.S. environmental groups ended the practice. In 1975, the Environmental Defense Fund, National Audubon Society, Natural Resources Defence Council, and the Sierra Club took legal action against AID for failing to prepare an Environmental Impact Statement (a requirement of the 1969 National Environmental Policy Act) on its pesticide programme. The lawsuit was settled, and AID completed the preparation of the Statement in May 1977. As a result, AID announced a new policy on pesticide assistance: it now requires a risk-benefit evaluation of pesticides proposed for use in its regular assistance programmes; and it no longer sponsors the purchase of pesticides not sold in the U.S.A., or pesticides that have been severely restricted in the U.S.A. Assistance for these pesticides is provided only in emergencies or after a careful review of the benefits and risks and alternatives has indicated their necessity. Further, the agency is now emphasizing the use of non-chemical methods as evidenced by its policy statement on pesticides and pest management established by AID's Administrator on 6 June 1978, stated here in part:

"The proper management of pesticide use is also a prerequisite to the development and implementation of integrated pest managment programs which avoid sole reliance upon pesticides by employing a wide range of biological, cultural, mechanical and chemical techniques to hold pests below damaging economic levels, while offering maximum protection to the environment."

In implementing this policy, AID, in collaboration with the Consortium for International Crop Protection (CICP), furnishes the services of pest management specialists and other expertise to assist the AID overseas missions in the design of plant protection components of agricultural projects. AID, through CICP, also carries out a variety of programmes in training and technical assistance aimed at advancing Integrated pest management (IPM) and pesticide managment.

AID's policy has attracted mixed reviews. Many environmentalists and plant protection specialists alike have extolled its virtues (see Bull, 1982). It has greatly reduced pesticide use in AID-financed projects, eliminated the use of many unregistered and hazardous pesticides that were once used freely in

these projects, and encouraged the use of IPM. On the other hand, some of the overseas AID missions and host countries believe that the policy's requirements are too strict. It is presently too early to determine its overall impact. Ultimately, the only real test of the AID policy will be to measure how much it has done to strengthen the host countries' capacity in pest and pesticide management. The AID policy can be expected to have little impact in those countries where the U.S.A. is a very minor donor.

When a complex of donors are involved in a developing country, each with a different attitude and policy on pesticide use, the chances for developing a uniform policy in pesticide use are greatly reduced. A developing country that has ostensibly achieved independence from a foreign power, may merely adopt the foreign government's policies on pesticides use. Even in a developing country that has achieved substantial autonomy, the old colonial power may still exert considerable influence through aid, technical assistance, etc.

Such government-sponsored organizations as the World Bank, United Nations Development Programme, FAO and Organization of American States that support economic development in the third world, also influence pesticide use. In Africa, Asia and Latin America, their assistance and credit programmes provide capital to governments and farmers to buy pesticides and other agricultural inputs. International government-sponsored insurance agencies may indirectly influence the pesticide situation in the developing countries. For example, the Export-Import Bank and the Overseas Private Investment Corporation (OPIC), both U.S. government-sponsored agencies, provide "political risk insurance" that guarantees U.S. corporations against losses due to war, revolution, insurrection, expropriation, or currency inconvertibility for as long as 20 years. The U.S. Treasury stands ready to cover losses by the insured corporations. Political risk insurance of this type may be a key ingredient in the financial formula required by multinational chemical corporations when making overseas investment decisions (Weir and Schapiro, 1981). Three of the four top recipients of OPIC support in recent years were large chemical producers. Between 1974 and 1976, Dow Chemical Company topped the list, receiving $181 million in U.S. taxpayer guarantees and W. R. Grace and Company received $70 million, according to Arnson and Goodfellow (1977).

INFLUENCE OF GOVERNMENT-SPONSORED RESEARCH AND EXTENSION

Research generates the knowledge required to understand pests and to develop strategies for controlling them. Extension involves extending the knowledge and the strategies to the farmers or other intended beneficiaries. The levels and kinds of government-sponsored research and extension programmes in a developing country greatly influence the pesticide use pattern and the use of alternative methods. Well-managed government-sponsored research, extension and public awareness programmes, geared to develop pest control programmes that draw heavily from non chemical methods and the discrete use of pesticides, are probably the best insurance against pesticide abuse in the developing world. Laws and regulations are important in preventing the use of unsafe pesticide materials and protecting workers and the environment. However, they will not ensure that the pesticides are used according to real need, based on economic criteria, and in the most judicious manner.

The level of government-supported research and extension varies radically between countries of the developing world. Some developing countries have virtually no research or extension; others, Malaysia, for example, have major programmes with emphasis on the development of IPM systems for one or more of the principal crops.

IPM has made significant progress in some of the developing countries (Brader, 1979; IOBC, 1981; Bull, 1982). Most of the efforts have been focused on non-food crops (cotton, oil palms, etc.) and not on the basic food crops of the subsistence farmers. However, major projects have been recently undertaken by FAO to develop IPM systems for rice in South and South-East Asia, and by the FAO and AID to develop IPM systems for millet, sorghum and other subsistence crops in the Sahel of West Africa. The International Rice Research Institute, West Africa Rice Development Association, some of the other International Agricultural Research Centers, other international organizations such as the International Centre of Insect Physiology and Ecology and various national governments are also promoting the development and implementation of IPM. The outcome of these government-sponsored efforts will have a major impact in determining the future course for pesticides in the developing countries.

CONCLUSION

As is so often the case with rapidly expanding technology, chemical pesticides have spread much more quickly in the developing countries than has the capability to ensure their effective and safe use. Some developing countries have not enacted legislation to govern the importation, domestic use, and disposal of these materials. Even with the laws, the governments frequently lack the infrastructure required to enforce them.

The pesticide problem in the developing world has come about largely because of an error in transfer of technology (Bottrell, 1983). Pesticide technology developed by and for use in the developed world has been exported to countries with cultures and social structures not prepared to absorb this technology.

Curbing the export of unregistered or highly hazardous pesticides from the industrialized nations would be an important step in correcting this problem. However, this is not easy, especially since it goes against the doctrine to *laissez faire*. The traditional rationale for *laissez faire* in the export trade is that each sovereign nation is free to make its own judgements about safety and to regulate accordingly. Nevertheless, this system is primed for abuse (Scherr, 1979). Certainly, it has brought on many problems of pesticide abuse in the developing world.

However, merely curbing exports will not correct the problem of pesticide abuse in the developing

countries. They must develop and enforce pesticide legislation best suited for their cultures and social structures. They also must develop their own research and extension programmes that will be required to ensure effective and safe use of pesticide technology. Donor governments can play an important role, by providing some of the information, research, technical assistance and training required to boost the developing countries' efforts. Non-government organizations have played an especially important role; but, ultimately, each developing country will have to map its own fate.

Acknowledgements—The Consortium for International Crop Protection is a nonprofit organization composed of 15 U.S. Universities and the United States Department of Agriculture. The Consortium is partially funded by AID, advises the agency on matters pertaining to crop protection, and works closely with AID personnel in carrying our various crop protection programmes in the developing countries.

REFERENCES

Arnson C. and Goodfellow W. (1977) OPIC insuring the status quo. *Int. Policy Rep.* Vol. 3, No. 2. Center Int. Policy, Washington, D.C.

Ayres J. (1978) Pesticide industry overview. *Chem. Econ. Newsl.* Jan.-Feb.

Bottrell D. G. (1983) Social Problems in pest management in the tropics. *Insect Sci. Applic.* **4**, 179–184.

Brader L. (1979) Integrated pest control in the developing world. *A. Rev. Ent.* **24**, 225–254.

Bull D. (1982) *A Growing Problem—Pesticides and the Third World Poor*. Oxfam, Oxford.

Freed V. M. (1979) Magnitude of the problem: three perspectives. In *Proc. U.S. Strategy Conf. on Pesticide Management*, pp. 21–25. U.S. Dep. State and U.S. Natl. Comm. Man and the Biosphere, Washington, D.C.

GAO (1979) *Better Regulation of Pesticide Exports and Pesticide Residues in Imported Foods is Essential*. Rep. No. CED-79-43 (June 22). U.S. Govt. Acct. Office, Washington, D.C.

Gitonga S. (1979) Development of an overall approach. In *Proc. U.S. Strategy Conf. on Pesticide Management*, pp. 40–41. U.S. Dep. State and U.S. Natl. Comm. Man and the Biosphere, Washington, D.C.

IOBC (1981) *IOBC Special Issue, Int. Organ. Biol. Control Noxious Animals and plants*. Centre for Overseas Pest Res., London.

Motooka P. S. (Ed.) (1976) *Proc. Conf. on Impact of Pesticide Laws*. East-West Center, Honolulu.

Scherr S. J. (1979) Magnitude of the problem: three perspectives. In *Proc. U.S. Strategy Conf. on Pesticide Management*, pp. 32–34. U.S. Dep. State and U.S. Natl. Comm. Man and the Biosphere, Washington, D.C.

UN (1978) *Yearbook of International Trade Statistics*. United Nations, New York.

USDS USNCMB (1979) *Proc. U.S. Strategy Conf. on Pesticide Management*. U.S. Dep. State and U.S. Natl. Comm. Man and the Biosphere, Washington, D.C.

Weir D. and Schapiro M. (1981) *Circle of Poison*. Inst. Food and Develop. Policy, San Francisco.

Whittemore F. W., Collier C. and Fowler Jr H. W. (1982) Registration and labeling. In *An Agromedical Approach to Pesticide Management—Some Health and Environmental Considerations* (Edited by Davies J. E., Freed V. H. and Whittemore F. W.), pp. 247–257.