

SPC 639.9097 SPC



South Pacific Bureau
for Economic Co-operation



South Pacific Commission



Economic & Social
Commission for Asia and the Pacific



United Nations
Environment Programme

South Pacific Regional Environment Programme

SPREP/Topic Review 10

Original: English

TOPIC REVIEW No.10

COMMENTS ON PEST AND PESTICIDE CONTROL

by

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South Pacific Commission
Noumea, New Caledonia
April 1981



SPC 639.9097
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SPREP / Topic Review 10
April 1981

ORIGINAL : ENGLISH

SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

Noumea, New Caledonia

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INTRODUCTION

I have been asked to discuss pest control and pesticide control.

I have spent my working life in the general field of research and development of pest and disease control of plants and plant products --- timber preservation; household pest control; insect pests; and fungous diseases of horticultural and tropical crops; as well as pest and disease control in fruits, vegetables and stored grain.

Forty years ago, when I first became involved in these subjects, there were only a dozen or so chemicals used, for pest control and pesticide control concerned issues such as chemical purity, particle size, formulation and general quality. The pesticides were mainly inorganic chemicals based on copper, lead, mercury, sulphur, chlorine, mineral oils and a few plant extracts such as nicotine sulphate, rotenone and pyrethrum. Today there are a thousand or more materials on the market and pesticide control, largely at the insistence of the environmentalists, has become a very complicated procedure; so much so that to have a new pesticide approved for use takes many years of testing, not to prove its efficacy so much as to satisfy legal requirements that its use will not be dangerous to the environment.

Many countries have instituted pesticide control procedures varying from voluntary notification to strict registration and approval before any pesticide may be used. To many people concerned with pest problems in their crops, animals, products or dwellings, some of the present-day requirements seem ridiculous. The pendulum has swung from virtually no control to stultifyingly absolute control in some communities. I would hope that those countries of the S.P.C. who are still without pesticide legislation will consider carefully their particular situation and requirements before instituting pesticide control procedures for themselves, but we shall talk about that later.

In my opinion, the current popular conception that any use of pesticides is harmful to the environment, is very dangerous and in fact insidious. The truth is that without pesticides, pharmaceuticals and the like, modern society could not survive. I must admit that those people who have campaigned against pesticides --- the "Silent Spring Brigade"---have been fairly successful in building up support; e.g. the anti-DDT and anti-245T campaigns. I have used these and many other chemicals in a variety of environments. In my experience, the hazard to the environment from the proper use of pesticides is grossly exaggerated. Emphasis must be on proper use, but not over-zealous and stultifying control. In many situations there is no need to use them at all, but there are other situations where their use is essential. In all cases, someone concerned must know about this--- whether or not to use a pesticide, which particular pesticide or pesticides to use, how they should be applied (spray, dust, granule etc.), at what application rate, when and how frequently to apply them and what to do about any residues that may be present. There are other necessary considerations, such as the effects of the treatments on organisms other than the target weed, pest or disease; the compatibility of different formulations or chemicals when mixtures need to be used; and the very important questions of storage and stock control, as well as procedures for disposal of outdated or surplus products. Yes, pesticide use is a complicated business, part science, part art and certainly requiring much experience.

LORD BOYD-ORR, FAO AND POST-WAR FOOD SUPPLY PROBLEMS.

At the end of World War II a group of people led by Lord Boyd-Orr became concerned about feeding the people of a world recovering from the ravages of war. Boyd-Orr clearly believed that even with the surviving populations, then much less than at the present day, there would be difficulties in feeding people and avoiding famine. Because of this concern, he and his supporters were able to persuade the United Nations to set up the Food and Agriculture Organisation, FAO, which since that time has promoted and supported schemes to increase food production in many countries. However, I doubt that Boyd-Orr and his supporters anticipated the enormous effect that pesticides (herbicides, insecticides, fungicides, nematocides, rodenticides, acaricides) were to have on food production and in public health and infectious disease control and thus, of course, on the world's population.

Together with increased use of fertilisers, improved animal and plant breeding systems and general farming skills, pesticides have had an enormous influence on the output of food and materials from the land in developed countries, especially North America and Europe. Benefits in under-developed countries seem to have been less spectacular, probably because the management skills required to utilise these technical aids have been lacking. As we can see any day in our news media, there are increasing reports of famine situations in the Third World. One may see here a forewarning of some of the same problems in the South Pacific area with which we are concerned, in that already, these islands once completely self-sufficient in food, now rely heavily for their staple diets on imported foodstuffs. These supplies come by shipping lines and aircraft whose future cargo operations in the area seem at this moment to be in doubt. Should this food source be curtailed, the importance of self-sufficiency becomes even more vital.

There is no doubt in my mind that the people of the South Pacific want to enjoy their share of the goods and services of the modern world. To earn this right and to feed their townspeople, to keep themselves and their animals healthy, they will have to learn to use pesticides wisely. I firmly believe that rather than this apparent concern about pesticides and the environment, the SPC should extend its efforts to persuading the leaders of the various island communities to educate their people where, how and what pesticides to use.

It must be appreciated that the use of any pesticide is not a solution in itself, but only an aid towards pest management. Its application must be undertaken with extreme care and the casual spraying of material onto a crop in the belief that this is all that is necessary is quite the wrong approach. It is in fact this careless type of action which has brought pesticides into conflict with environmentalists--- it is not only bad for the environment, but more often than not fails to achieve the control aimed at. Thus it is evident that the users of pesticides must have knowledge of techniques required and be capable of carrying them out efficiently.

The first thing to be learned is that there must be study of the particular situation and problem. If it is a crop, the person concerned should take time to learn about the plant, information coming from various sources, reading, listening and looking. Knowledge accumulated over the years throughout the world is freely available for the asking. There are no state secrets in crop husbandry; the information is available to those who take time to seek it out. Not all the advice will necessarily apply generally. Much is useful only in special areas and situations. The skill to select useful information from irrelevant or misleading accounts is not learned quickly. Similarly, and ~~this~~ this is a serious consideration in this area, the South Pacific, it must not be expected that one who has become expert in growing healthy crops in one part of the world will be able necessarily to transfer his methods immediately to another.

Most likely, adaptation of some kind will be required before the techniques can be transferred. This takes further observation and study. The same principle applies whether against household pests, stored products pests or any other group.

Learning about the crop one learns about the pests and diseases which may attack it, the factors which may lead to one or more of these becoming troublesome, and management methods which may be used to reduce the damage. The fact that a weed or pest is present does not necessarily mean that it is going to be troublesome and require treatment, or moreover, that the treatment to be applied need be a pesticide. Decisions about actions to take must be based on wide experience and knowledge. The same principle applies whether one is dealing with pests in buildings, animals, plants, or stored products--- chemical pesticides are not necessarily the correct approach, but often they are the only successful one.

BIOLOGICAL CONTROL

In Nature it is normal for one organism to feed on another. Pest control is the art of trying to prevent other organisms from beating Man to his food and materials supply. In this campaign, Man is assisted by a wide range of biological phenomena, one of which is called biological control, which endeavours to make as much use as possible of this basic function of organisms feeding one on another. Usually biological control of pests refers to insects which have a highly-developed system of host or prey and parasite or predator relationship. The host insect feeds on plant, animal or organic material and in turn is eaten by its "natural enemies". There can be no doubt that biological control helps in some measure to prevent loss of food and materials before Man can obtain and make use of them. Furthermore, there can be no doubt that introducing a chemical pesticide into the system can kill off the "natural enemies", the good helpful, parasites and predators, and thus upset biological control. There have been many examples where an organism which had been kept at very low numbers by natural control suddenly has become a major pest when pesticides were introduced e.g. phytophagous mites. In practice, biological control tends to take effect too late in the scheme of things, after much damage has been done. Crops can be almost destroyed before the parasites and predators take control of the damaging organism. The very few successful examples of effective biological control of a weed plant, or insect or animal pest, are widely publicised. Seldom is the public informed about the very numerous attempts to introduce biological control which have failed, or where the effect was so limited as to be of no practical significance.

There have been some quite successful schemes of pest management involving artificial rearing in the laboratory of "natural enemies" for strategic release against the potential pests of a crop. Such operations are usually complicated. They require a fairly straightforward host plant/ pest/ Parasite or predator relationship, expensive facilities for mass-rearing of the "natural enemies", dedicated and highly-trained staff and particularly, farmers or growers who understand the programme and who can be relied upon not to carry out any management procedures detrimental to this programme. Co-operation of all those who grow the subject crops in the district is essential for the successful operation of this form of management.

INTEGRATED CONTROL

There is another system for employing "natural enemies", or rather, trying not to interfere with their activities. This has been called integrated control. It is not an easy system to define and in fact often means different things to different people. When first promoted as a cheap, simple means to revitalise an area of abandoned apple orchards in Nova Scotia, it meant minimum use of pesticides in order to save expense.

In integrated control the choice of pesticides and their pattern of use are carefully controlled to permit optimum activity of "natural enemies". Even so, a degree of crop damage from pests will occur. In fact, the system should be attempted only when a moderate level of pest damage can be tolerated. If anything approaching a clean, pest-damage-free crop is the objective, integrated control would be unlikely to satisfy. In the few situations where integrated control appears to have been successful, there has usually been an extensive range of "natural enemies" operating on the pest problem, a climate favourable to the "natural enemies" and a choice of alternative foods to keep the "natural enemies" going when the host pest population is too low to support them. The system has been far from easy to employ, even more difficult to manage than mass rearing and release of selected parasites and predators as in pest management biological control.

This is not to say that it is easy to obtain clean, pest-damage-free produce by using pesticides. Even with a full armoury of products and formulations available and the best equipment to apply them to the crop, it takes very skilful and thorough work to avoid all pest damage. In nearly every situation some loss from pests of one sort or another has to be endured. However, without doubt, successful farmers, growers and indeed nations, are those who minimise pest damage through effective use of all available weapons, and especially by the use of pesticides. Unfortunately, it seems the common practice in the South Pacific region for those people working on the land to be of a lower socio-economic scale compared with those employed in towns. If these countries are to become economically independent, since large-scale industrial development seems unlikely in the near future, this has to be reversed, bearing in mind the position in the more highly-developed countries, where a smaller and smaller but more and more intelligent section of the community is involved in food production. In those parts of the Pacific with which I am acquainted there is a general lack of concern about growing good clean crops of produce for local consumption or export. Similarly, there appears to be an almost total lack of interest within the general population in the protection of the environment. If your programme stimulates some interest in changing these attitudes this will be to the great advantage of those populations.

I am aware that the results of the crop pest and disease survey conducted by the South Pacific Bureau of Economic Co-operation (SPEC) have produced host lists for some of the island nations. This exercise was undertaken with the object of facilitating inter-island trade in produce where quarantine considerations would allow. The lists may have disturbed some administrators.

CONTRCL OF PESTICIDES

Some Governments in the region already have legislation to control the sale or use of pesticides, other countries have been considering doing so. Even with the necessary legislation, it is by no means an easy task to administer the rules and regulations wisely and to avoid being too strict or too lax. Control has to allow the efficient use of pesticides, but at the same time provide protection against misuse, causing hazards to the people, their domestic animals, wild life, vegetation and fish. Not only must the administration be wise, but members of the general population concerned need to fully understand their rights, privileges and obligations under the law. In small islands and atolls, with people inexperienced in their use and care, some pesticides could be quite dangerous to health or the environment.

It would seem that those countries in the region with pesticide controls have tended to follow the practices taken at home by their respective colonial powers of earlier times. The most thorough and complicated of these is that operated in U.S.A. by the Environmental Protection Agency (E.P.A.). Products meeting EPA labelling standards and products meeting the requirements of France, the United Kingdom, Australia or New Zealand, should be acceptable, to the extent that their label recommendations fit the needs of the South Pacific. Most, if not all pesticides likely to be marketed in the South Pacific will have been through one or more of the approval schemes in these countries and have been thoroughly tested in regard to toxicology and pattern of residue decline. Nevertheless, each country of the South Pacific region should have legislative powers to protect its citizens and environment from misuse and unscrupulous trading.

One of the first requirements for any pesticide control scheme is a list of the materials likely to be sold in the area. For the South Pacific Region this essential task has already been undertaken by I.D.Firman. His "Guide to the Safe and Efficient Use of Crop Protection Chemicals Available in the Pacific Islands Served by the South Pacific Commission" is much more than merely a list. This S.P.C. Pesticide Handbook (1976), which I understand Ivor Firman is at present updating, is a publication with which all people concerned with pest control should be familiar and have readily available. The handbook contains a section (pp4 & 5) on "responsibility and legislative control when dealing with pesticides".

I can only add to that section the following suggestions for which local legislation should provide.

Instructions for use on labels should relate to the uses recommended locally and they should be prominent in the local language as well as in English or French.

It should be possible to prevent the sale or use of chemicals or particular formulations of chemicals which are considered particularly hazardous or unsuitable for use under local conditions.

Rules should permit the prohibition of importation of products which have been rejected in their country of origin or anywhere else for any reason e.g. poor quality, out of date, hazardous etc., in other words, to avoid "job lots" being dumped on the market.

There should be provision to lay down "waiting periods" or the intervals between application and harvest should this become a problem in particular situations.

In general, it might well be simpler for all concerned if a central information centre was established by say, the South Pacific Commission, to keep the register of products up-to-date and to collaborate with other centres in the region, such as New Zealand's Agricultural Chemicals Board. This would permit fairly rapid exchange of information throughout the South Pacific.

Finally, it is vital that in all the countries of the region local advisers should be available at all time to growers and other citizens, since it would be quite impracticable to expect the bulk of the population likely to need to use pesticides to have the specialised knowledge necessary.

