PESTICIDES: NECESSARY BUT DANGEROUS POISONS

GILLES FORGET

The year 1972 saw nearly 500,000 pesticide poisoning cases around the world. The figure for 1981 was 750,000. The problem continues to worsen. It is estimated that every year close to two million people worldwide are poisoned by pesticides, and 40,000 of them die as a result. This trend is disturbing and difficult to explain.

Is this the price to be paid for high performance agriculture, which increasingly relies on fertilizers, herbicides, and fungicides? Chemical imports have increased phenomenally in the Third World. From 1970 to 1980, the real value of pesticide imports increased more than six-fold.

Perhaps these figures are more of a reflection of researchers' deeper concern about poisonings of this nature. If so, the growing toll is really the result of more accurate data collection.

One way or another, the danger is real. So why continue to use such dangerous products?

Agriculture is now almost impossible without chemical fertilizers or pesticides. In the tropics, most of the soil is not very fertile. Fertilizers are a welcome adjunct. But most of the pests that undermine agriculture are also found in the tropics: rodents, insects, nematodes, fungi, weeds, and so on.

It is also in this part of the world that populations are growing most quickly, in step with urbanization. Subsistence farming, hitherto practiced on small plots of land, is no longer adequate to feed the world. As a way out of the impasse, modern agricultural strategies must be employed, the soil must be continuously enriched, and a strict program must be established to control insects and other pests that destroy crops.

Pesticides also play an important part in most battles against diseases transmitted by insects. Programs to destroy the vectors of malaria, leishmaniasis, Chagas' disease, and onchocerciasis with pesticide sprays have been partially successful.

Unfortunately, this approach by itself presents some serious problems. It is expensive and increases Third World dependency on the industrialized countries that supply the chemicals. Nor does the propaganda stop there. The industrialized countries also suggest that the Third World adopt high-yield crop varieties that require numerous polluting inputs.

Although human health appears to be seriously affected, that is not always true for the insects. The impressive recuperative power of insects from generation to generation is too often forgotten. In very little time, insects develop resistance that enables them to survive most insecticides with impunity!

This explains why the campaigns against malaria-carrying mosquitoes undertaken throughout Africa, Asia, and Latin America are doomed to failure. At the same time, to get around the resistance phenomenon, millions of dollars are spent every year to develop new agricultural insecticides. Since 1945, more than 15,000 compounds have been synthesized to circumvent insect resistance. Since 1945, more than 15,000 compounds have been synthesized to circumvent insect resistance. These same compounds have been combined in 35,000 insecticide mixtures. Nevertheless, insects continue to ravage crops and spread disease. Ultimately, Third World consumers pay the bill.

Some developing countries, such as India and Egypt, have attempted to reduce their economic dependency on the North by asking multinational chemical
Four thousand
Sri Lankans die annually because of
pesticide poisoning.
A poison control centre
is trying to decrease this
number by informing
communities.

There are promising projects designed to
study the natural enemies of some harm-
ful insects. Even bacteria are being
brought into play. An example is Bacillus
thuringiensis, which can inhibit the
growth of mosquitoes carrying malaria
and yellow fever.

This issue of Reports contains accounts
of several IDRC-supported projects
related to the poisoning of people
in developing countries and to the use of
pesticide substitutes.

In China, Professor He Fengsheng is
studying the health of cotton farm workers
who use synthetic pyrethrin derivatives as
pesticides. Despite favourable reports on
their low toxicity to people, these com-
ounds have already caused serious
poisonings in Hubei Province.

In Kenya, a scientist at the University of
Nairobi is attempting to clarify behaviour
responsible for pesticide poisoning of
farm families.

In Sri Lanka, a physician and an
epidemiologist have created a poison con-
tral centre and are attempting to assess its
impact on the incidence of poisoning in
the country.

Two other articles deal with attempts to
develop and use less harmful pest control
techniques. One describes research in
India aimed at using a naturally-occurring
tiny parasitic organism called Nosema
locustae to control locusts. The other ex-
amines the role of women as active
promoters of "integrated pest manage-
ent" - an approach that calls for minimal
pesticide use -- in farm communities in
the Philippines.

In all these cases, the objectives are com-
plementary: to sensitize governments and
users by clearly describing the scope of
the problem; to identify the causes of
poisoning and if possible to discover ap-
propriate solutions; and to find less toxic
alternatives to the excess use of chemical
pesticides.

This summary of the serious problem of
pesticide poisoning should give you an
idea of its disturbing scope. Above all, it
should demonstrate the dedication of
these Third World researchers, striving to
create a better and less dangerous world
for their people.

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producers to set up operations on their
soil. In theory, this decision is logical. It a-
llows the countries to produce those pes-
ticides that are indispensable for agricul-
tural production and the maintenance of
public health, at affordable prices. In ad-
dition, jobs in pesticide plants have be-
come a coveted source of income for
workers.

In industrialized countries, businesses
are controlled by strict industrial safety
standards. In the case of developing
countries, unfortunately, manufacturing
technologies are often imported without
appropriate industrial safety measures to
going with them. Why? Frequently, because
of economic constraints, lack of under-
standing of the production process, or
simply because of incomplete information.
Whatever the reason, the consequen-
ces can be disastrous; the catastrophe in
Bhopal, India, is eloquent testimony.

It is often forgotten that pesticides are
"naturally" toxic to human beings. Indeed,
the most popular pesticides, the or-
ganophosphates (such as Dianizon and
other products ending in similar suffixes)
attack the nervous system. They were
developed during the Second World War
as chemical weapons, but were so toxic
that neither side could bring itself to use
them before the end of the war. Later, after
the war, it was realized how sensitive in-
sects were to them. It was at that point
that they made their first appearance in the
arsenals of farmers and public health
authorities.

Health effects defy explanation

In the 1950s, we were told that every-
thing was known about the chemical
mechanisms and physiological effects of
organophosphates. Had they not been
studied in the laboratory? However, doc-
tors have recently been describing
syndromes related to organophosphate
poisoning that defy any explanation
based on current understanding of the
chemistry of these pesticides. How many
of these effects are still unknown? How
many deaths of men, women, and
children in the Third World attributed
to natural causes have actually been caused
by pesticides. Recent studies conducted in
the Philippines by Dr Michael Loevinsohn
indicate there may have been many.

Organochloride insecticides such as
DDT are another important class of pes-
ticides, although they have been some-
what displaced by organophosphates.
They resist environmental degradation so

well that they are rapidly incorporating
themselves into the food chain. For this
reason, their use has been severely
restricted. They have even been banned
by many countries. However, they are still
in use throughout the Third World. DDT
is the best known of these. In some
African countries, it is even used to protect
dried fish from vermin. The problem here
is not so much one of toxicity as of attitude
on the part of uninformed users.

To deal with insect resistance and pes-
ticide toxicity to people, producers have
turned to new classes of compounds,
often of plant origin. The pyrethrin ex-
tacted from chrysanthemums, for ex-
ample, is the basis for an important fami-
ly of pesticides: the pyrethroids. These
compounds are less toxic to people.
However, several cases of poisoning
caused by imprudent use have been
reported, particularly in China.

What about the herbicides used primari-
ly in agro-industry to manage fields of cof-
fee, sugar cane, and cotton? These may
greatly facilitate crop maintenance, avoid-
ing the necessity of weeding, but they are
also highly toxic. Compounds of the
phenoxycetic acid family (such as 2,4,D,
for example) are carcinogenic. However,
they are widely used in the Third World.
Nearly 85 percent of world pesticide
production is consumed in the industrial-
ized countries. Yet the incidence of pes-
ticide poisoning is 13 times higher in
developing countries. These figures speak
for themselves. It is imperative that the
scope of pesticide poisoning be clarified
and that the factors that make it such a
serious problem be identified.

Third World researchers must never lose
sight of the complexity of the debate. How
can an expanding population be fed
without harming the health of farm
workers? How can the impact of insect-
borne diseases be reduced without
destroying the ecological balance of our
environment?

Epidemiological studies have shown that
farm workers are the group hardest
hit by accidental poisoning. This is an oc-
cupational health problem that could be
solved in part by education and training
programs.

Several options have been put forward
to reduce chemical pesticide dependency:
crop rotation, development of resistant
varieties, or the use of natural predators.
These methods, combined with reduced
and careful pesticide use, can produce en-
viable harvests.