

Safe and effective use of pesticides - Summary of 7 years of research -

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Safe and Effective Use of Pesticides is the report of a seven-year-long research programme that looked at the best way to reduce pesticide use among low-income farmers in developing countries while improving the effectiveness with which they used the products and the safety of their practices. The research was undertaken as part of a Risk Fund set up by Novartis in 1988 to support its business activities in the Third World; the study was sponsored by the Novartis Foundation for Sustainable Development.

An International Steering Committee was set up to oversee the project. At the outset, the project wanted to clarify:

- What factors hinder the safe and effective use of pesticides in developing countries;
- What sort of groundwork can or must manufacturers, in collaboration with other institutions, lay to eliminate these factors; and
- What, in a given social cultural context, are the communication methods best suited to the farmer community.

The selection of countries to be included was guided by a desire to carry out a social marketing experiment in three nations that represented similar economic development but widely disparate sociocultural environments as well as agricultural practices. India, Mexico, and Zimbabwe were chosen; combined, they are fairly representative of agriculture in the developing world. Novartis affiliates in each country helped set up local project organisations that took responsibility first for baseline studies in 1992-93 on farmers' knowledge, attitudes, and practices (KAP) regarding pesticides, and then for implementation of the communication campaigns that followed, starting in 1993. Control and test areas were established in each country.

Before the communication campaigns were launched, it was important to consider the availability of media for reaching small farmers as well as to identify the media that were most attractive and credible. In Mexico, radio has both audience appeal and reach, and was used to reinforce messages delivered during special farmers' meetings. In India, in contrast, films are an important source of entertainment and an escape from daily drudgery; the use of television and VCRs allowed a film to reach all test villages without spilling over into neighbouring regions. In Zimbabwe, folk theatre and the oral rendition of stories and messages is a lively, vibrant, and yet ancient tradition. It has instinctive and almost reflex appeal, and this alone made the medium the right choice for this country.

It turned out to be very difficult to assess or measure the impact of isolated interventions in a dynamic social environment where life in general changes constantly through improved communication and where competitive companies and agricultural extension services are active. The programme over such an extended period of time in such diverse cultures led to a learning process that raised additional questions and issues to be analysed, and thereby some issues that later on were found to be of importance were not covered by the initial baseline study.

The project ran into a few setbacks and unexpected obstacles during its five years, which is not surprising, given the nature of doing research in a changing world. First, in retrospect there were a few specific problems in the selection of areas for the project. In Mexico, the climates of the test and control areas were known to differ slightly, but we did not expect that the difference would vary with years or seasons. (Generally, similarity between the two areas is important, but even more important is the requirement that any difference that might exist should not vary during the intervention period). In India, the fact that the control area surrounded the intervention area proved more of a problem than we expected in terms of hindering our ability to afford a spillover effect.

In addition, several economic and information factors that could not have been anticipated may have affected the study's results. A drought in Zimbabwe, for example, changed farmers' perceptions of the importance of effectiveness versus safety. An earthquake in the test area in Mexico in October 1995 temporarily set back efforts to interest local farmers in the intervention programme. And in the control area in Mexico, a communication programme by a competitor around the same time as the project may have led to many of the favourable changes in knowledge levels that we found there at the end of the study period.

Nevertheless, it is possible to track some specific changes in farmers' attitudes and practices when measured against four hypotheses for the project that were established by the Steering Committee.

Hypothesis One:

Through communication and training we will improve practice in:

- Skin protection,
- Preparation of spray solution,
- Washing of body and work clothes,
- Spraying and application, and
- Maintenance of spraying equipment.

In Mexico, personal safety is the area where major improvements were detected. Persistent changes were found in the use of shirts, boots, and footwear; in the washing of work clothes and hands; in sprayer cleaning; and in avoidance of the chili can as a measuring device. Major attitude changes were detected at focus group sessions. The project therefore had a favourable impact on comparatively simple, cheap safety practices, while more cumbersome practices did not change for long or were used even less.

In the test region in India, the practice of having a full body wash after spraying rose significantly and was sustained. Washing of work clothes worn while spraying was at a high level in 1996 and was sustained in 1997. The use of gloved hands for mixing pesticides showed a small improvement but dropped sharply after cessation of intervention. Significant improvement in the maintenance of spraying equipment was registered. Farmers' and spraymen's practice of taking precautions before breaking for food, drink, or a smoke was at a high level, and it persisted in the project area. And the use of a full-sleeved shirt and full pants went up significantly, but after cessation of intervention these dropped somewhat, although still registering positive change.

In Zimbabwe, personal hygiene and skin protection were already at a high level when the project started. The project had a further positive impact on the use of gloves, proper shoe attire (gumboots and so on), and the use of full body protection. Another significant increase was reported in the regular washing of work clothes. Project managers also recorded a much higher percentage using gloves when mixing pesticides, which was a desired result. Overall, the project had a positive impact on reported attitudes regarding personal hygiene and skin protection.

Hypothesis Two:

Through communication and training we will improve practice in:

- Optimisation of quantity of plant protection agents used and of spray parameters,
- Storage of plant protection agents, and
- Disposal of empty containers.

This area showed some favourable changes in Mexico, but to a lesser extent than in the personal safety area. The changes that persisted after the intervention programme ended include not repacking the pesticide package, storing pesticides out of children's reach, and improved disposal of empty containers.

The safe storage of crop protection agents was at a high level in both regions in India at the baseline, and that continued through 1997. The safe disposal of pesticide containers showed no improvement in either area. The use of a measuring glass was at a high level in 1992, fell in 1996, and then rose again in 1997 back to the level at the baseline. The intervention programme ensured that a good practice more or less continued.

The baseline study in Zimbabwe revealed a high level of knowledge in the area of storage of chemicals and disposal of empty containers. Although there was no change in the first regard, the correct disposal of empty pesticide containers improved in the test area. A cotton pest calculator was introduced in an attempt to improve the use of the optimum quantity of pesticide. The result was not noticeable, however, as this tool needs a more comprehensive introductory programme, including field training working with heavy pest infestation. Such training was not possible during the project period.

Hypothesis Three:

Through communication and training we will improve practice in:

- Identification of pests and beneficial insects,
- Selection of suitable product,
- Determination of correct dosage,
- Usage of suitable equipment,
- Correct timing of application, and
- Proper application techniques.

There were relatively few detectable effects in Mexico in the area of pest identification and product selection. Knowledge of beneficial insects improved, and focus group sessions detected more rational attitudes towards pesticides. However, no yield or productivity effects were detected by the KAP studies even though demonstration plots managed by project technicians produced superior crop yields.

In India, inspection of plants before taking a decision to spray and the decision regarding the pesticide to be used both improved significantly as a result of the intervention, but this change did not continue. Knowledge of beneficial insects amongst farmers and sprayers rose substantially but it dropped later (though it remained at a higher level than at the baseline). The practice of determining the correct dosage improved substantially and more or less continued in the project area. The commencement of spraying operations before 9:00 a.m. (when it is cooler and therefore there is less evaporation, making use more effective) rose significantly among farmers and sprayers in the project region, but this positive change was not sustained.

It is not easy to summarise the improvement in this area due to the project in Zimbabwe. Farmers received chemicals in the past through a credit scheme. The impact of a liberalised market on the use of suitable products remains to be seen. Knowledge of beneficial insects remained at a moderate level. But only half the farmers reported that they keep up with regular maintenance of equipment.

Hypothesis Four:

Improvement of farmers' economics will facilitate their adoption of messages on safety.

It is difficult to prove this hypothesis with a KAP or observation survey. Evaluation should instead be based on the results of qualitative surveys and the experience of local project staff. Still, it seemed that in Mexico the demonstration of more-productive crop protection techniques on the plots managed by the project staff sparked farmers' interest and raised their level of trust, which in turn facilitated communication. More rational attitudes towards pesticides affected farmers' perception of both effectiveness and safety issues. Otherwise, however, there does not seem to be a strong link between these issues, as safer practices were adopted despite a lack of noticeable improvements in effectiveness.

Qualitative research studies in India indicated that there was widespread appreciation among farmers that Novartis had put considerable effort into improving farmers' health by teaching them how to enhance their safety as well as improve their crop yields through the effective use of pesticides. This credibility of Novartis could be considered as contributing in a large measure to the positive changes noted in the adoption of safety measures and the consequent improvement in the health of the farmers and sprayers in the project area, as reported during informal interviews during a visit to the region in 1998.

The continuous changes in the climate in Zimbabwe from year to year and a severe drought in 1995/96, which meant the loss of food as well as cash crops, had a considerable negative impact on farmers' economic situations. In general, available funds are used first for basic needs (daily operating expenses, for example, or schooling for children) before investments are made in safer use of pesticides. It is too early to tell if the liberalised cotton market will improve the financial situation of cotton farmers there enough to allow them to purchase adequate safety gear and spraying equipment.

Overall, therefore, the interventions did have a positive impact. We learned some important lessons during the course of the project. The most fundamental one was that messages need to focus on practical, basic, ready-to-use, but effective recommendations. Suggesting the use of impractical or expensive items or habits can dilute the overall message about safety precautions. Indeed, a highly technical and expensive approach is not needed to improve safety. The good news is that a small number of simple changes make a big difference and this, according to our experience, is feasible. In addition, the mix of communications media used in each country kept being refined during the project, reinforcing the point that social marketing campaigns need to be tailored to specific locations.

Special efforts were made to include in the communications campaign children of the farmers who use pesticides, which was also innovative. In Mexico, a playbook and cartoons were used, while in Zimbabwe children were encouraged to attend the plays put on by the project. A series of programmes for rural schoolchildren was introduced in India. This not only helped spread the message to the parents, it also served to prepare tomorrow's farmers to use pesticides safely and effectively. The project's use of these communications media could be called ground-breaking.

Despite the increase in the number of farmers adopting improved practices, a large number still did not do so even though they were aware of the health risks. There are at least three possible explanations for the persistence of the phenomenon. The first is that the "early adopters" or those most susceptible to change may have adopted some of the changes, leaving the laggards yet to be convinced. (This will necessarily take more time.) The second is that the producers in the regions are very poor so they are risk-averse and cannot take chances about the possible consequences of change, especially if the changes involve financial outlays. For example, the purchase of protective gear fell sharply after a subsidy from the project was removed in India; conversely, though, few farmers in one area used gloves (a recommended safety precaution) even though they were made available at no cost by a major pesticide company.

A third reason for farmers not taking precautions even though they were aware of the importance of doing so was that "external forces" overwhelmed rational behaviour. Thus, the drought in Zimbabwe and a sharp devaluation in Mexico disrupted all farming activities, including those related to the use of pesticides. These may well have been short-term disruptions, however, so their long-term effects are still open to question.

One somewhat sobering result of the project is that social marketing campaigns have to be done on a sustained basis, as farmers tend to fall back into undesirable attitudes and habits after some time. Change cannot be maintained with time-restricted interventions only. There is a pronounced need for ongoing intervention to ensure persistent change.

Another important lesson is that safety messages in isolation are not likely to have a big impact, but when delivered in conjunction with an effectiveness message, the safety point can be much more appealing to the farmer. (The farmer, however, analyses and assesses the package, and discards components according to a number of factors). Messages that do not exclusively focus on the farmers but also involve their social environment (the family, peers, and so on) are more successful, as they trigger additional pressure and heightened awareness about the issue. An attractive intervention programme that seems to be in the overall interest of the farmer will create a ripple effect over and above the intervention group or area, leading to a broader impact on society.

In conclusion, the project draws attention to the fact that if farmers were to take a series of relatively simple steps, they could reduce their exposure to pesticide-related health risks. At present, many if not most farmers give low priority to "safety", and many have not adopted the necessary precautions to reduce health risks. Some procedures may well be made more acceptable to low-income farmers-for example, by developing and subsidising the sale of both cheap and comfortable clothing that can provide adequate dermal protection. In the main, though, it appears that there are few if any easy ways to promote change among large numbers of poor smallholders.

There will have to be a continued reliance on sustained efforts such as some of those incorporated in this project. But all available experience indicates that there are limits to the extent to which changes will be adopted within a generation. Even the best and most sustained efforts run into the paradoxical situation that not everyone who can adopt relatively simple modifications in behaviour will actually do so, even when it is shown that the changes are in the person's long-term best interests. Given that, any pesticide manufacturer that cannot guarantee the safe handling and use of its toxicity class 1A and 1B products should withdraw those products from the market. At the same time, since in all likelihood pesticides will continue to be the technology of choice for crop protection in the years ahead, there is a continued need to get farmers to adopt the most important risk-reducing procedures.