



# ECONOMY AND ENVIRONMENT PROGRAM FOR SOUTHEAST ASIA

## POLICY BRIEF

### AGRO-CHEMICALS, PRODUCTIVITY AND HEALTH IN VIETNAM

Like many developing countries, Vietnam promotes the use of agro-chemicals (fertilizers, pesticides, herbicides) to boost agricultural production. As many countries have found, however, farmers often misuse these chemicals, applying them excessively or in ineffective ways. The results are damages to the health of farmers, consumers and the ecosystem, and often a reduction of farmers' profits due to the cost of the chemicals. A recent EEPSEA-supported study found all of these problems in Vietnam and suggests that better information programs for farmers and more vigorous promotion of Integrated Pest Management could be effective in changing farmers' behaviour.

The research project was carried out by a team of nine university- and government- based researchers in Hanoi, Ho Chi Minh City and Cantho. The study was financed in part by a special grant to EEPSEA by Norsk Hydro Pte. Ltd., the world's largest fertilizer company. Norsk Hydro had itself suspected that Vietnamese farmers were disregarding the recommendations provided by the firm and were instead using fertilizers in excessive amount and improper mixtures. While good for sales in the short run, the resulting damages could put the company's reputation at risk in the longer run.

Norsk Hydro therefore asked EEPSEA if it could organize a team of Vietnamese researchers to investigate the problem and suggest solutions. The researchers, all graduates of EEPSEA's five week courses in environmental economics in 1995 and 1996, were given technical support by Dr. Agnes Rola, the Philippines' foremost expert on the economics of agrochemicals.

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## Economy and Environment Program for Southeast Asia

The research was carried out against a background of agricultural expansion in Vietnam, a general increase in agro-chemical demand and the development of the country's indigenous agro-chemical industry. For example, the quantity of agrochemicals used in Vietnamese agriculture tripled between the late 1980s and 1994. Many of those used (e.g. about 23% of all insecticides) are classified as extremely hazardous by the World Health Organisation.

The team first analyzed a large number of previous descriptive studies which provided a picture of widespread misuse of chemicals, particularly over-application of nitrogen and under-use of potassium and phosphorous. The reason seems to be a widespread perception that nitrogen is the most "powerful" ingredient in fertilizer. In fact, this unbalanced application requires higher overall doses and has the side effect of making the plant more susceptible to insect infestations. This in turn leads to even more chemical use, as pesticides are applied. The end results are eutrophication of water from fertilizer and exposure of consumers and farmers alike to high levels of chemical residues. (In one study, 60% of rice growers in the Mekong Delta reported sickness due to pesticide use.)

The researchers then interviewed 240 farmers from representative sites around the country. These field studies were conducted with rice farmers in the Red River Delta and Mekong River Delta and with vegetable farmers in Ho Chi Minh City. The researchers collected data on chemical inputs and crop yields, socio-economic indicators and education levels, as well as soil types and other related agricultural information. The team then went on to look at the health impact of chemical use on farmers and consumers and interviewed consumers to find out their perceptions and attitudes and to ascertain their willingness to pay for safe produce.

Using the results from the three regions, the researchers then undertook an economic analysis of chemical use to determine the optimal fertilizer mix that would maximize farmer's profits. From this it was possible to work out how much the chemical mis-use was costing - a calculation which took into account both profit forfeited due to loss of production and the cost of the excess chemicals themselves.

The research teams found that, especially in the Red River Delta, farmers tend to maximize yields. Consistent with secondary sources, they found that, especially among the vegetable farmers and Mekong Delta rice farmers, there was over-use of nitrogen and under-use of potassium and phosphorous. Farmers could benefit in terms of higher profits if they followed an optimal fertilizer and pesticide mix. This would help mitigate environmental and social impacts. The researchers found that application problems were mainly due to poor practice, with only 65% of farmers reading instructions and only 39% understanding them and following them correctly. They concluded that a combination of better education and information, along with an increase in the price of nitrogen, should help bring about the required changes.



Furthermore they found considerable willingness to pay for safety and health. Vegetable consumers were found to be willing to pay a high premium for safe products - up to 85% higher for cabbage and 68% for tomatoes. (There have been several highly publicized cases of acute pesticide poisoning from vegetables in Vietnam's major cities; the high premia probably reflect awareness of these risks.)

Although there is a government-sponsored program on integrated pest management (IPM), the researchers called for a more pro-active approach to IPM and integrated nutrient management amongst research institutions. The researchers called for long-term research to create data bases on fertilizer-pest-pesticide interactions. Basic research on nutrient management and cropping patterns and their impact on soil nutrient content was also called for.

Results of this research are being discussed among Vietnamese researchers and officials. There also plans to open up consultations between Vietnam and the Philippines on this subject. The Philippines has also suffered considerable environmental and health damage from agro-chemical misuse and its experience in dealing with the problem could well prove instructive.

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The full text of this study is available as an EEPSEA Research Report:

*Impact of Agro-Chemical Use on Productivity and Health in Vietnam* - Nguyen Huu Dung, Tran Chi Thien, Nguyen Van Hong, Nguyen Thi Loc, Dang Van Minh, Trinh Dinh Thau, Huynh Thi Le Nguyen, Nguyen Tan Phong and Thai Thanh Son

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