

Vietnam Defoliants Study Sees Effect of 100 Years

By JOHN W. FINNEY

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WASHINGTON, Feb. 21—The American use of chemical herbicides in the Vietnam war, long a subject of controversy, caused wounds to the ecology of South Vietnam that may take at least a century to heal, the National Academy of Sciences has concluded.

The herbicides, according to an academy study, caused "serious and extensive damage" to the inland tropical forests and destroyed 36 per cent of the mangrove forests along the South Vietnamese coast.

In addition, the report said that there were indications that the herbicides when used for the destruction of crops, caused deaths among children of the Montagnard tribes in the hills of western South Vietnam.

Controversy Spurred Study

These conclusions about the harmful, long-term effects of the use of herbicides in the war appeared in a report by National Academy of Sciences to the Defense Department that is to be submitted to Congress in the next few days.

The report is scheduled to be made public next week by the Senate Armed Services Committee, but meanwhile the contents were summarized for The New York Times by members of the academy, a prestigious scientific group that often serves as

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an arbiter for the Government in matters of scientific controversy.

The study was ordered by Congress in 1970 at a time of controversy over the impact of the extensive use of herbicides in the war. At that time, the military was defending the use of herbicides—the first time that such chemical agents had been used so extensively in warfare—against rising complaints from the scientific community of long-term destruction to the South Vietnamese ecology.

Between 1961 and 1971, the United States dropped more than 100 million pounds of herbicides—or about six pounds for every inhabitant—on South Vietnam. More than 5.7 million acres, or about one seventh of South Vietnam's land mass, was sprayed with the chemical agents, which were generally for more potent than the herbicides commonly used for agricultural purposes.

The herbicides were largely used to strip away foliage in areas believed to be occupied by North Vietnamese or Vietcong troops, thus exposing them to attack. To a lesser extent, however, the herbicides were also used for destruction of crops, particularly in the Central Highlands area.

Psychological Effect Cited

Aside from the ecological impact, the study concluded that the use of the herbicides had had an adverse psychological effect, turning Vietnamese opinion against the United States. Symbolically, the report said, the herbicides came to be regarded as "an American assault on the Vietnamese land and people."

The principal Congressional mandate given to the academy, however, was to study the environmental impact of the herbicides. The study was made by 17 scientists from the United States, Sweden, Britain and South Vietnam headed by Dr. Anton Lang, a plant pathologist at Michigan State University and director of the Atomic Energy Commission's plant research laboratory at the University.

None of the panel members had previously been particularly identified as conservationists or critics of the use of herbicides in Vietnam. Therefore, the general expectation in the Defense Department, which had been directed by Congress to commission the study, was that the panel would come up with a generally favorable report.

Pentagon Called Surprised

Defense officials were described by members of the scientific community as somewhat surprised by the generally critical approach taken in the report, which was carried out in secrecy and submitted nearly a month ago to the Pentagon.

The critical nature of the report may influence the debate in the Administration over including herbicides within the prohibitions of the 1925 Geneva treaty on chemical and biological warfare.

The Administration has taken the position that the treaty does not preclude the use of herbicides or tear gases. The Senate Foreign Relations Committee has refused to consider the treaty, which has never been ratified by the United States, until the Administration interprets it to ban the use of tear gases and herbicides as well as poisonous gases.

The report did not deal at any length with whether the herbicides might have increased stillbirths or birth defects among Vietnamese children. Some scientific studies, including one conducted by the United States Army, have indicated that dioxin—a toxic, insoluble impurity found in defoliants—can cause liver damage, genetic changes and cancer.

One of the unexpected findings of the new study, however,

was that herbicides apparently caused deaths among Montagnard children. The military has consistently maintained that the herbicides had only a transitory effect on plant life and were used in such a way that they would not endanger human life.

This finding was based on interviews by Dr. Gerald C. Hickey, an anthropologist at Cornell University with wide experience in South Vietnam, with montagnard refugees from 12 villages in Pleiku and Kontum provinces.

Out of the interviews emerged this picture: After a plane had passed by, "spraying smoke," practically all the people in a village would show symptoms such as abdominal pains, intense coughing and rashes like "massive insect bites."

The adults recovered, but after some of the attacks, which were directed at crops, some of the young children were said to have died. In one village, the refugees told Dr. Hickey, 38 children died. In another, the refugees said simply, "lots of children died."

In some cases, according to the refugee reports, the dead were babies carried on the back of their mothers into the fields after the herbicides had been deployed.

From the like symptoms reported by villagers, Dr. Hickey, in one chapter in the report, reached the preliminary, yet to him conclusive, finding that the illness and deaths were caused by the herbicides. One theory within the scientific community specifically implicates dioxin.

Within the panel some differences developed over the extent of the damage to the tropical forests in inland Vietnam that are the principal source of hard woods for the Vietnamese economy.

Objections on Photographs

The majority concluded that the damage was "serious and extensive," but less than had previously been estimated in studies by the United States Agency for International Development. This conclusion provoked dissenting views from two panel members—Pham Hoang Ho, a professor of botany at the University of Saigon, and Paul W. Richards, a biologist at the University College of North Wales, who is regard-

ed as a pre-eminent authority on tropical rain forests.

The differences arose largely over the methods used to assess the damage. Because the inland forests are still largely under Vietcong control, it was necessary to rely on aerial photographs. One of the criticisms held that the photographs were inadequate for the measurement of the damage done beneath the dense canopy of a tropical forest. It was also said that the photographs had been improperly analyzed by graduate students at the University of Washington.

The report found that the damage in the tropical forests would persist over a "very long period." The normal period for a hard wood tree to mature in a tropical forest is 70 to 100 years.

When it came to the mangrove forests along the southeast coast of South Vietnam, the report was more precise in assessing the damage. It estimated that 36 per cent of the mangrove swamp land—one of the breeding grounds of fish for the Vietnamese diet—had been destroyed and that it would take well over 100 years to recover.