

Notes on the History and Consequences of Herbicide Usage in Vietnam

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Introduction

The long term consequences of herbicide usage in Vietnam remain one of the most painful and enduring legacies of the American War in Vietnam. For a period of just over eight years, the US military sprayed an estimated 20 million gallons of herbicides over an area roughly equal to 8.5 percent of South Vietnam's total area. During this time, the US used a variety of different herbicides, but that which constituted approximately 80 percent of the herbicides sprayed, and which has also become the issue's dominant symbol, was Agent Orange, a compound named after the orange stripes on the fifty five gallon barrels in which it was shipped. This paper's purpose is to examine the history, consequences, and controversies associated with herbicide usage in Vietnam. As will be discussed, Agent Orange and herbicides remain such a powerful issue because of the lingering disagreements over their long-term effects on human health.

The Historical Background to Herbicide Use

The first application of herbicides in Vietnam took place on 10 January 1962. Three days later, on 13 January, the US Air Force began Operation Ranch Hand, the official name of the program responsible for herbicide spraying. The origins of the decision by the US military and its South Vietnamese allies to use herbicides traced back to the unresolved political issues associated with the 1954 division of Vietnam into the pro-American Republic of Vietnam in the south and the Communist Democratic Republic of Vietnam in the north. According the Geneva Accords signed that year, a nationwide election was to be held within two years to elect a president for a government of a unified Vietnam. Seeing that the likely winner of such an election would be the northern leader Ho Chi Minh, the US and its South Vietnamese allies never implemented the agreement. Unsatisfied with this failure, the northern government in 1959 decided to embark upon the reunification of the country by force. In the following years, the north began infiltrating soldiers and supplies into the south, and also remobilized the resistance infrastructure that had been partially demobilized after the 1954 accords. Given their material and numerical disadvantages, the southern resistance began a campaign of guerrilla warfare in which one of their most important tactics was the use of the south's dense forests and vegetation to conceal their soldiers and

movements of war material. This tactic proved extremely effective as it enabled the establishment of an effective supply network, but more importantly, it allowed resistance fighters to harass the southern military and conduct brief but intense hit-and-run type attacks against southern targets. Faced with this situation, the US military began spraying herbicides as a part of a “territorial denial” policy that would prevent the southern resistance from benefiting from these topographical advantages.

The war’s early years saw the employment of a variety of herbicides. In January 1965 the military first sprayed Agent Orange. The initial sites for spraying had been the areas along Highway 15 running out of Saigon, but usage gradually expanded to include areas around military encampments, vegetation that lined the waterways of the Mekong Delta and Vietnamese coastline, areas of suspected enemy troop concentrations, and the region known as the Ho Chi Minh Trail. In order to disrupt food production, the military also sprayed crops lands under resistance control. Herbicide spraying reached its peak in 1967 and by this time also included areas in which North Vietnamese Army units were present. Spraying gradually declined in the following years until it was officially halted with the issue on 1 May 1970 of a presidential directive to end herbicide spraying. The last Operation Ranch Hand mission was flown on 9 May 1970 (see Duckworth 1999). During the previous years, herbicides had come to be known as the “soldier’s best friend” because they spared soldiers the difficult and time-consuming task of manually clearing vegetation around their positions, and also reduced casualties by denying enemy soldiers close-range concealment points. After an increase in casualties in the first seven months following the halt, limited spraying was again allowed until the withdrawal of American forces in 1973. By war’s end the US had used fifteen different herbicides, 90 percent of which had been delivered by fixed wing aircraft.

Investigations Begin

When the US began spraying herbicides in the early 1960s, officials exhibited few concerns about their usage. Correspondingly, few precautions were taken when handling them. That this was so was not entirely surprising. Herbicide usage had for decades played an important role in American agriculture, but with the invention in 1945 of the “organic herbicides,” manufactured chemical compounds with a toxicity so great that they reduced the required dosages to a small percentage of previous requirements, they had become even more prominent. Many of the herbicides used on American farms, albeit in much lower concentrations, were later used in South Vietnam, including Agent Orange. Despite this increased usage, people had yet to fully comprehend their potential harmful side effects. One early handbook issued by the Seventh Air Force Tactical Operations group even stated that the herbicide was “completely harmless to humans and animals” (Duckworth 1999). The Communist resistance in the south did not share this sentiment. In the early 1960s resistance leaders issued a warning to their soldiers, “Use a handkerchief to breathe through. Get out of the area as soon as possible, going into the wind. But do not run. Leave affected

people alone. Do not use artificial respiration” (Wisser 1984: 80). These warnings, however, were more likely related to concerns that the US would engage in chemical or biological warfare, and were not based upon a scientific understanding of the herbicides’ consequences.

Concern about the potential harmful effects of herbicide use began to mount in the late 1960s. By late 1969, the US government had changed its position on herbicides and declared that Agent Orange was to be considered “an imminent hazard to human health, mainly due to the trace contaminant dioxin (TCDD)” (see Duckworth 1999). The reason for the change related to increased recognition of the dioxin’s toxic effects. Agent Orange was a liquid composed of equal parts of two active ingredients, 2,4-D and 2,4,5-T, both herbicides. Its toxicity derived from the presence in the latter compound of minute traces of 2,3,7,8-tetrachlorodibenzo-p-dioxin (also known as TCDD). TCDD belongs to the family of dioxin congeners, and has been classified as the most toxic of all. On average, Agent Orange had a concentration of TCDD at a level of 3 parts per million (ppm). Another herbicide used by the military from 1962–64 was Agent Purple, which had a dioxin concentration at 30 ppm. In addition to the growing understanding of these compounds’ toxicity, scientists also discovered that these compounds did not quickly disintegrate in the environment unless they received constant and direct exposure from the sun. In Vietnam, they usually remained in the soil and, through floods, erosion, and even farming, continued to be circulated in the ecosystems in which they were applied.

The most obvious toxic side effect of the dioxins present in herbicides was an increased risk of certain cancers.¹⁾ As scientific studies have shown, dioxins remain in the body, particularly in fatty tissues. Of particular concern is the presence of dioxins in the breast tissues of women of child-bearing age because, with breast feeding and also perhaps during gestation, the mother passes dioxin on to her child. The first scientific studies in Vietnam to investigate this issue began in 1970 when a group sponsored by the American Association for the Advancement of Science, and led by J. Constable and M. Meselson, visited areas in Vietnam where herbicide spraying had occurred and not occurred, in order to collect breast milk samples. This same group returned in 1973 for further studies, but the fall of the Republic of Vietnam in April 1975, and the subsequent international isolation of the reunited Socialist Republic of Vietnam, brought investigations to a temporary halt. Since 1983, researchers from the United States, most notably the dioxin specialist Arnold Schecter, have regularly collected fatty tissue and breast milk samples (see Schecter et al 1995).²⁾ The Vietnamese scientific community, both independently and with international collaborators, has also actively investigated the issue, although their efforts have been seriously constrained by a lack of adequate funding and facilities. Many samples, in fact, have to be taken to laboratories outside Vietnam for analysis. The United States and Vietnamese governments have also recently begun a joint research project that will, ideally, provide definitive answers to the questions raised by herbicide spraying.

The Long Term Consequences

It is impossible to accurately estimate how many people in Vietnam have been affected by herbicide spraying.³⁾ Given that the associated toxins remain in the ecosystem, the group of affected individuals includes not only those who were directly sprayed or came into immediate contact with the chemicals, but also those who, years later, encountered them through food, nursing, or other avenues. Food is a particularly important source of dioxin contamination as dioxins in the fatty tissues of animals consumed by humans are then deposited in fatty tissues of the human consumer, and continue to accumulate over the years. Although concentrations vary between areas, scientists estimated that in the 1980s, dioxin levels in blood and tissue samples taken from affected areas in southern Vietnam exceeded levels found in most industrial countries.⁴⁾ Vietnamese officials estimate that approximately 400,000 Vietnamese have either died or been otherwise directly affected by dioxins introduced from herbicide spraying (see Plummer and Arias 2000). Among the most common ailments linked to dioxin exposure are cancer, neurological and metabolic disorders, and increased rates of reproductive disorders and miscarriages.

The most poignant effects of dioxin exposure have been the large numbers of children born with birth defects. Some estimates place the number of these children at approximately 500,000. The defects they suffer from include mental retardation, spina bifida, missing or malformed limbs, harelip, and cerebral palsy. Many of the affected areas have birth defect rates that exceed five percent of all live births, far higher than the three to four percent rates normally found in developed countries (Dreyfuss 2000: 11). In some highland communities where spraying was particularly heavy, birth defect rates have been estimated to be as high as one in ten births (see Satchell 1999; for photographic evidence, see Anonymous 1999). Children with such birth defects are referred to in Vietnam as “Agent Orange Babies.” Given that caring for them often creates a burden that many families are unable to support, some 600 of these children live in the eight “peace villages” set up by the Vietnamese government (see Plummer and Arias 2000). Located near the major urban centers of Hanoi and Ho Chi Minh City, these facilities provide needed care to the children, but as the government remains in extreme financial straits, the care they receive is not fully adequate. The Vietnamese government, in fact, can only provide a stipend of approximately seven dollars per month to assist these families (Dreyfuss 2000: 11).

The Question of Causality

The scientific community has for several decades recognized that exposure to herbicides and dioxins has negative effects on human health, but one of the most vexing questions for those who have been exposed is determining precisely what those effects are. On this point, the history of dioxin and herbicide exposure parallels that of other diseases. Unlike infectious diseases, which are caused by a distinct and identifiable pathogen, such as a virus or bacteria, and which have a clear and relatively predictable disease process, diseases caused by more difficult to conclusively identify

environmental factors, such as pollution or chemical contamination, are less predictable in both their disease processes and the outcomes for those exposed. For example, in the famous case of mercury poisoning in Minamata Bay, some exposed individuals suffered horribly, while others did not. This unpredictability makes the establishment of unequivocal causal relationship extremely difficult, and also makes it comparatively easier to throw into question or discredit explanations that do assert causal relationships. Establishing the consequences of herbicide use and dioxin contamination in Vietnam and the US has also been complicated by political and economic factors. The decision to use herbicides was made by the US government. Out of a desire to avoid being shouldered with a massive liability costs, the government was for many years extremely slow to fund research related to the issue. During the tentative attempts to reestablish diplomatic relations between the US and Vietnam in the late 1970s, the United States even declared to the Vietnamese that any effort to place the consequences of herbicide use on the agenda would lead to an immediate end to the talks. Concerns over liability also weighed heavily on the minds of the managers of the companies that manufactured Agent Orange and other herbicides, such as the chemical giants Dow and Monsanto. In 1979 a group of more than 200,000 veterans filed a class action law suit against the seven companies that had manufactured Agent Orange. The companies settled the suit out of court in May 1984 for \$180 million (see Anonymous 1984). However, as part of the settlement, the companies did not admit to any definitive links between Agent Orange and specific illnesses.

Despite this shortcoming of the settlement, the activities of the veterans groups had galvanized public interest in the issue and created the political will to investigate the consequences of herbicide usage. As a result, the past seventeen years has seen the development of a progressively more sophisticated understanding of the issue. In 1984, the US government released its first report on Agent Orange, but at that time it concluded that only three conditions were linked to it: liver cancer, skin cancer, and circulatory problems (see Wisser 1984). A 1994 study by the National Institute of Medicine expanded this definition and linked it to skin rashes (specifically the condition chloracne), soft-tissue cancers, and lymphatic cancers. In 1996 the linkages expanded again when prostate cancer, multiple myeloma, respiratory cancers, and spina bifida were added to the list. Most recently in November 2000 the US Veterans' Administration included diabetes as a related condition. These changes illustrate the evolving scientific understanding of the consequences of herbicide exposure.

The US scientific community has taken an important lead in investigating the after-effects of Agent Orange, but even with their limited resources, Vietnamese scientists have also made important contributions. The creation of a definitive understanding of herbicides' after-effects in Vietnam, however, has been complicated by a number of factors. First, given the interruptions that occurred in research in the post-1975 period as well as inadequate funding, it has been difficult to establish a definitive set of baseline data and associated changes over time. Second, disentangling dioxin levels caused by herbicide usage and from other sources, such as burning plastics or the use

of leaded fuels, is extremely difficult, if not in some cases impossible. Third, comparative data from other countries must be used with caution as the rates of poverty, under-nourishment, and malnutrition are higher in Vietnam. This creates the possibility that, given generally poorer health, exposure might have slightly different consequences. And fourth, while Vietnam does have comparatively high levels of dioxin contamination, there are other countries, such as Japan, that in some localities have higher levels. This raises the obvious issue of why, in these places, there is not a matching or higher rate of birth defects or other associated diseases. Future research will undoubtedly make progress in resolving these issues.

The Contemporary Situation and Final Thoughts

The past two decades has seen a significant change in the scientific understanding of the consequences of herbicide exposure. Contemporary research efforts will hopefully make further advances, but given the persistence of dioxins in the soil in many areas of Vietnam, the problem cannot be resolved quickly. Reflecting back over this issue's history, it is clear that one troubling legacy of herbicide usage in Vietnam is the enormous suffering it has caused people in both Vietnam and the United States. The effects of continued exposure are obvious on the Vietnamese side, but even among the aging American veteran population, the after effects are still emerging, and the suffering continues. Perhaps even more troubling is the fact that while the level of human suffering caused by exposure has for decades been clear, the desire of the chemical companies that produced the agents and the government that decided to employ them to protect their political and economic interests hindered the development of a quick and effective response to the problem. It is heartening that such a response is at least being formulated, but it is undeniable that it has been far too slow in coming.

Notes

- 1) For a full description of the numerous health consequences of dioxin, see Schechter 1994.
- 2) Even these scientific relationships have been contentious at times, such as the 1995 seizure of research documents from Arnold Schechter by the Vietnamese government. They were later returned (see Anonymous 1998).
- 3) It is also impossible to estimate the number of American soldiers affected by exposure. For a discussion of the increased awareness of the negative consequences of exposure among US veterans, see Duckworth 1999.
- 4) Elevated dioxin levels in industrial countries often derive from, among other factors, industrial processes, the use of leaded gasoline or diesel fuel, and the incineration of waste.

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A Note on Resources

Given the social and political importance of this issue in both Vietnam and the United States, many documents detailing the history of herbicide usage, the evolving scientific understanding of its consequences, and the major policy responses to it, are available on the internet. Particularly useful websites include that of the Vietnam Red Cross Society Agent Orange Victim Fund (<http://vn-gw.net.vn/~orange/>), the Environmental Media Services page regarding dioxin and health (http://www.ems.org/dioxin/sub2_dioxin.html), the Agent Orange Website of Lewis Publishing Company (<http://www.lewispublishing.com/orange.htm>), and the Agent Orange Debrief (<http://goiv.com/ao/>).