



# CASE STUDY



## YELLOW RAIN

**Overview.** Reports in the 1970s of Yellow Rain, alleged chemical/toxin weapons attacks in Southeast Asia and Afghanistan, sparked the first large-scale investigation conducted by the United States into allegations of chemical and biological weapons (CBW) use. While the United States officially found that toxin weapons had been used in Southeast Asia and Afghanistan, questions regarding use, agent composition and responsibility still remain. The Yellow Rain case study focuses attention on some of the difficulties that can arise during an investigation, including problems in obtaining good data, the challenges in confirming use and reaching an attribution determination in the absence of such data, and the consequences that flow from these difficulties.

**Background.** Starting in 1976 in Laos, 1978 in Cambodia (Kampuchea) and 1979 in Afghanistan, there were reports of chemical or toxin weapons use against the Hmong, Khmer and Afghans. The alleged attacks were often described as a helicopter or plane flying over a village and releasing a colored cloud that would fall in a manner that looked, felt and sounded like rain. The most commonly reported color was yellow. Thus the reported attacks in the three nations became known as ‘Yellow Rain’.

The similarities in the descriptions of attacks and subsequent symptoms in Laos, Cambodia and Afghanistan raised suspicions that the same agent was being used. All three locations were linked in some manner to the Soviet Union. In Afghanistan, the Soviets were directly involved

in the war, and in Laos and Cambodia, they supported Pathet Lao and Communist Vietnamese forces.

Beginning in 1979, investigations by multiple countries and the United Nations were conducted into the allegations of chemical/toxin weapons use in Southeast Asia and Afghanistan. In 1981, the United States Secretary of State announced that physical evidence had been found, proving that mycotoxins (poisonous substances produced by fungi) supplied by the Soviet Union were being used as a weapon against civilians and insurgents in Southeast Asia and Afghanistan.

The United States determination that toxin weapons were being used was based on an investigation by U.S. government employees, who, with the assistance of volunteers and refugees from the affected countries, collected biomedical and environmental samples for laboratory analysis, acquired medical data on alleged victims, administered questionnaires regarding alleged attacks, and searched for other information that could confirm or refute aspects of the refugee reports. The United States continued its investigation through the mid-1980’s, collecting and analyzing pertinent information on the alleged attacks.

Not everyone concurred with the finding that Yellow Rain was CBW attacks involving mycotoxins. Some nations were unsuccessful in finding mycotoxins in their sample analysis, the United Nations found the evidence to be inconclusive, and an alternative hypothesis emerged, suggesting that the ‘yellow rain’ reported by the Hmong, Khmer and Afghans was actually just a naturally occurring phenomenon of a swarm of Asian honeybees defecating in flight.

**Discussion of Obligations.** Several international legal agreements and obligations under customary international law are applicable to the Yellow Rain case study.

The 1925 Geneva Protocol outlaws the use in war of any poison, and is deemed to cover any use of chemical, biological or toxin weapons. Under the terms of the Protocol, however, the parties agreed to be bound “as between themselves,” and thus the Protocol applies only where belligerents to a conflict are also parties to the Protocol. While the Soviet Union was a party to the Protocol at the time, Afghanistan, Cambodia and Laos were not, and therefore the Protocol would not apply to the conflicts in those countries. However, based on developments since 1925, the U.S. took the view (shared by a large majority of states) that by the time of the Yellow Rain allegations, the prohibition on first use of chemical, biological and toxin weapons embodied in the Protocol had been recognized as part of customary international law and hence binding on all states regardless of adherence to the Protocol. Thus, even if the Protocol did not apply, first use of chemical or toxin weapons in any way by any state would constitute a violation of customary international law.

The 1972 Biological and Toxins Weapons Convention (BWC) specifically forbids the stockpiling, acquisition, development or transfer of biological or toxin agents for hostile purposes. The Soviet Union was a party to the BWC at the time of the Yellow Rain allegations. The Chemical Weapons Convention was not concluded until 1993.

Under this legal structure, if the agent in question were a chemical, it would fall under the prohibition in customary international law on first use of chemical weapons. On the other hand, if the agent were biological or a toxin, it would be subject to both the customary international law prohibition on first use of such weapons and the BWC prohibitions. Additionally, any use of a chemical, biological or toxin weapon against civilians resulting in large scale morbidity and mortality is a human rights violation and a war crime.

**Compliance Analysis.** In 1984, President Reagan formally reported to Congress that the Soviets had “repeatedly violated their legal obligation under the Biological Weapons Convention and customary international law as codified in the 1925 Geneva Protocol” through “their involvement in the production, transfer and use of toxins and other lethal chemical warfare agents that have been used in Laos, Cambodia and Afghanistan.” This position has continued to be the official policy of the United States government, even though the Yellow Rain findings have been strongly debated in the press, academia and even within the government.

Recent non-governmental reanalysis of the Yellow Rain investigation suggests that while the evidence most strongly supports the hypothesis that chemical/toxin attacks occurred in Southeast Asia and Afghanistan, the scientific evidence is not strong enough to answer with certainty questions regarding the composition of the agent, the intent of use, or whether the agent originated in the former Soviet Union.

The difficulty in reaching a conclusive finding on the Yellow Rain investigation derives from multiple challenges faced by the original team assigned to determine if the CBW allegations were true. Investigation challenges included:

- Long periods of time passed between alleged exposure to an attack and presentation of the victim or other supporting evidence to the investigative team;
- Laboratory analysis techniques were less sophisticated, and as such, not as reliable as analysis today;
- Limited baseline medical information on alleged victims existed, making it impossible to determine the normal range of physical characteristics and environmental exposures;
- Operational challenges of conducting an investigation during hostilities;
- Lack of formal protocols for investigators in the field and possible problems with interview techniques;

- Integrity of samples collected were at times compromised by sampling/handling techniques;
- Manpower shortages, particularly in administrative positions and limited experience in field investigation team; and,
- Funding problems that often forced breaks in the investigation.

**Compliance Dialogue.** The United States officially responded to the allegations of CBW use in Southeast Asia in 1978 through a demarche to Laos, Vietnam and the Soviet Union. All three nations denied any use of chemical agents. Following subsequent demarches in 1981 and 1982, however, there was a marked decrease in reports of CBW attacks.

**Lessons Learned.** The investigation into allegations of CBW use in Southeast Asia and Afghanistan serves as an important case study for examining the challenges of proving or disproving use, assigning attribution and enforcing compliance. The ability to assess accurately an allegation not only has implications for monitoring compliance with international legal agreements, but also directly impacts concerns for victims, public health and arms control.

Some of the larger unresolved issues raised by the Yellow Rain investigation include the level to which it is important to coordinate with experts in academia and industry -- particularly in areas where government expertise is limited; the potential for Nongovernmental Organizations (NGOs) to provide important information regarding allegations of use; and the level of international coordination necessary to successfully conduct an investigation. While all data collected in an investigation are useful, the Yellow Rain case study demonstrates that some evidence is particularly useful in determining use and attribution. For example,

- The ability to differentiate between naturally occurring disease and morbidity and mortality from an intentional attack is essential. Having good baseline data

on the health of the population greatly assists in this task.

- Ideally, biomedical samples should be collected from both victims and controls and environmental samples should be taken from allegedly affected areas and control areas.
- Medical records of alleged victims should be obtained when possible, and culturally sensitive, non-leading questionnaires should be used to interview witnesses. Timely access to witnesses should be a priority.
- If possible, evidence should be collected on any munitions fragments, affected vegetation and affected animals in alleged attack regions.
- Analysis of samples should be conducted at first on-site, followed by internationally-certified laboratories, and whenever possible, independently by several laboratories at once.

The primary policy lesson from the Yellow Rain investigation is that seldom will an investigation into allegations of use be conducted in a perfect environment with perfect information. Thus, there will almost always be ambiguities that will affect the ability of the verifier to reach a definitive compliance judgment. The policy maker's challenge is to determine how much evidence is sufficient in order to reach a decision on use, assign attribution and enforce compliance.

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