Long-Term Health Effects and Human Rights Violations Associated with the 1964 USDA Pesticide Study in Greenville, Mississippi

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1 Introduction

This report examines the 1964 USDA pesticide study in Greenville, Mississippi, focusing on its potential human rights violations, health risks, epigenetic and behavioral impacts, and efforts toward compensation and environmental restoration. The study, conducted in a predominantly Black, low-income region, raises concerns about environmental justice and long-term health effects on residents and their descendants.

2 Background of the 1964 USDA Study

The 1964 USDA study, titled "Determination of Impact of Agricultural Pesticides on the Environment: A Preliminary Report of Data Recorded from Greenville, Mississippi through December 15, 1964," was a pilot program to monitor pesticide residues in the Mississippi Delta. Conducted by the USDA's Agricultural Research Service (ARS), it targeted Greenville due to its heavy pesticide use in cotton, rice, and soybean production. The study aimed to assess residue levels in soil, water, crops, livestock, and non-target species like bees, with a three-year plan to track accumulation trends.

2.1 Objectives

- Quantify pesticide residues in environmental and biological samples.
- Monitor residue depletion or accumulation over time.
- Assess impacts on non-target organisms, particularly bees.
- Inform pesticide policy for the Secretary of Agriculture.

2.2 Methods

The study involved:

- Sampling: Soil, water, crops, livestock, and bees were sampled across two one-square-mile areas in Greenville, subdivided into blocks. Soil samples used a 2-inch

corer, water samples included various sources, and bee colonies were monitored with traps.

- Pesticide Analysis: Gas chromatography and other techniques detected residues like DDT, methyl parathion, and arsenic.
- Data Collection: Biweekly progress reports and detailed data sheets were used, with pesticide use histories compiled via farmer interviews.

2.3 Findings

Preliminary results showed:

- Low residue levels in soil and water, despite heavy pesticide use.
- Arsenic in nearly all soil samples (4–5 ppm baseline, higher in some).
- Pesticide residues in pollen but not honey; bee populations dropped post-application (e.g., from 40,000 to 30,000 at GRA).
- No significant soil residue buildup during the study period.

3 Human Rights Violations

The study raises significant human rights concerns, particularly the lack of informed consent from Greenville's predominantly Black, low-income residents. The document does not mention notifying or obtaining consent from local communities, who were likely exposed to pesticides like DDT, methyl parathion, and arsenic. This omission suggests a potential violation of bodily integrity and the right to be informed about environmental risks.

3.1 Environmental Racism

Research from a 2022 BMC Public Health article (Pesticides and environmental injustice) highlights that pesticide exposure disproportionately affects BIPOC and low-income communities due to structural racism. In 1960s Greenville, Black residents, often marginalized and lacking land ownership, were likely more vulnerable to exposure from nearby agricultural fields. The USDA's collaboration with landowners, likely white, without community engagement, supports claims of environmental racism.

3.2 Legal Implications

The lack of consent could support legal claims under:

- 42 U.S.C. § 1983: Violation of constitutional rights by state actors.
- Negligence: Failure to mitigate known pesticide risks.
- Environmental Justice: Disparate impact on Black communities.

4 Health Risks Associated with Pesticide Exposure

Pesticides used in the study, including DDT, methyl parathion, endrin, toxaphene, BHC, and arsenic, are linked to serious health risks. A 2024 ScienceDirect study (Systematic review of pesticide exposure) outlines:

- Cancer: DDT and arsenic are associated with breast, leukemia, and lung cancer. A 2003 PubMed study (Pesticide exposure and breast cancer) found links to breast cancer mortality in Mississippi.
- Neurological Effects: Organophosphates like methyl parathion cause neurotoxicity, linked to Parkinson's, Alzheimer's, and ADHD.
- Reproductive Issues: DDT and endrin are endocrine disruptors, causing infertility and birth defects.
- Other Effects: Respiratory issues, skin irritation, and immune suppression.

5 Epigenetic and Behavioral Issues

Pesticide exposure can induce epigenetic changes, altering gene expression across generations. A 2016 Environmental Research study (Transgenerational effects) found paternal pesticide exposure linked to birth defects and developmental disorders in offspring. Organophosphates are associated with behavioral issues like ADHD and aggression, as noted in a 2017 Journal of Occupational and Environmental Medicine study (Pesticide exposure and neurobehavioral problems).

6 Effects on Descendants

Children and grandchildren of those exposed in 1964 may face increased risks of cancer, developmental disorders, and behavioral issues due to epigenetic changes and persistent environmental contamination. A 2014 Environmental Health Perspectives study (Prenatal pesticide exposure) found prenatal organophosphate exposure linked to lower IQ and ADHD in children. The Mississippi Delta's ongoing environmental challenges, as noted in a 2025 Guardian article (Infrastructure neglect), exacerbate these risks.

7 Compensation and Restoration Efforts

No specific compensation programs for the 1964 study are documented. However, broader initiatives address environmental and health disparities in the Mississippi Delta:

- Delta Health Alliance: Works to improve health outcomes through community programs (Delta Health Alliance).
- Environmental Cleanup: Efforts to rehabilitate Mississippi Delta oxbow lakes, as noted in a 2007 ScienceDirect study (Pesticide contamination in oxbow lakes), aim to restore water quality and ecosystems.

8 Conclusion

The 1964 USDA pesticide study in Greenville, Mississippi, likely exposed residents to harmful pesticides without consent, raising human rights and environmental justice concerns. Health risks, including cancer and neurological disorders, may persist in descendants through epigenetic mechanisms. While no direct compensation exists, regional initiatives address health and environmental disparities. Further research is needed to quantify the study's long-term impacts.

9 References

- US pesticide regulation is failing the hardest-hit communities
- Silent Spring environmental science book by Rachel Carson
- Pesticides and environmental injustice in the USA
- New study shows growing risks of pesticide poisonings
- DDT regulatory history: a brief survey to 1975
- Pesticide use peaked in 1981, then trended downward
- Pesticides in the diets of infants and children
- DDT: a brief history and status
- Pesticides impacts on human health and the environment
- Systematic review of pesticide exposure and health impacts
- Researchers aim to reduce pesticide drift in Mississippi Delta
- Contaminants in the Mississippi River: pesticides
- Pesticide contamination in Mississippi Delta oxbow lakes
- Infrastructure neglect and poverty in Mississippi Delta
- Pesticides in Mississippi air and rain: 1995 vs. 2007
- Pesticides in Mississippi air and rain comparison
- Barriers to healthy eating and physical activity in Mississippi Delta
- Deepwater Horizon oil spill: human health and ecosystem
- Pollution on the Mississippi River
- Association of pesticide exposure and breast cancer mortality
- Transgenerational effects of paternal exposure to toxicants
- Prenatal pesticide exposure and neurodevelopmental effects
- Pesticide exposure and neurobehavioral problems in children