# Assessing Per- and Polyfluoroalkyl sustances (PFAS) in urban, rural, and minority-owned agriculture in the U.S.

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## As the global community aims to feed the 8 billion people on the planet, assessing PFAS substances in urban and rural agriculture becomes an important component of the mission

Science's pursuit of novel and innovative methods for the collection, quantification, identification, and characterization of the approximately 4700 PFAS compounds is paramount to understanding the current and long-term effects of these "forever chemicals". Specifically in an agricultural setting. As the world aims to feed itself, PFAS substances in urban and rural agriculture become very significant. The urban or rural agriculture environments can present many challenges in identifying a PFAS source. Equally challenging is the identification and access of minority-owned agricultural lands to be included in the research. This article addresses approaches and practices for PFAS research, source identification on or near agricultural lands, and ways to engage minority-owned agriculturalists.

### Approaches for PFAS research

Per- and Polyfluoroalkyl Substances (PFAS) are of imminent concern and are currently classified as emerging contaminants. In April 2021, the newly appointed EPA Administrator, Michael Regan, released a "Memorandum Regarding Per- and Polyfluoroalkyl Substances". The memorandum states his commitment to addressing the challenges associated with PFAS contamination and commitment to action in reference to the need for data to improve "EPA's understanding of 29 PFAS and to solicit data on the present and treatment of PFAS in wastewater discharges". He goes on to state there will be an EPA Council on PFAS (ECP) charged to develop the "PFAS 2021-2025 – Safeguarding America's Waters, Air and Land" strategy. In this new EPA strategy to make decisions based on new science regarding PFAS contamination, new research is required for the identification, characterization, quantification and modeling of PFAS compounds in water, air and soil matrixes for the development of national drinking water regulations. Environmental leaders have collectively agreed to stop the production and, in some countries, use of select PFAS (e.g., PFOS, PFOA) compounds. The concerted effort is one measure of progress to reduce continued PFAS contamination globally.

### Practices for PFAS research

Research has shown the importance of understanding how PFAS moves in the air (i.e., atmospheric deposition), sorbs to the soil, and diffuses to groundwater sources. Current literature continually adds to science relating PFAS dispersion on agricultural lands and the surrounding water bodies. Specifically through the discharge from industrial manufacturing facilities, aqueous film-forming foam (AFFF) use sites, and wastewater treatment facilities. But more research is needed to characterize the mechanisms by which these compounds disperse through agricultural lands. That is, do they inhibit crop production? How can agriculturalists use best management practices to reduce land exposure to these compounds? What are the impacts of atmospheric deposition? Few states (e.g., Maine, Michigan, New Jersey, and Iowa) have implemented policies and practices to aid agriculturalists in assessing PFAS presence in soil and water. That is, measuring, monitoring and identifying potential sources of PFAS. More states should consider incorporating PFAS monitoring, in conjunction with nutrient management, as part of their best management practices.

## Source Identification on or Near Agricultural Lands

Oftentimes remediation experts and practitioners spend years and, in some instances, decades pinpointing the source location of a contaminant. The deposition location may be known, but changes in the vadose over time can determine where a contaminant may disperse. With the many applications of PFAS compounds in everyday products as an identifiable source outside of those listed above, can appear ubiquitous. A quick review of sample collection, preparation, and analysis procedures or methods brings light to the source identification complexity. Source identification may be quite simple in rural environments where hundreds of acres of land exist. Whereas in urban environments where less than an acre may be used (e.g., an abandoned lot) presents a more complex problem for source identification. The challenge is getting policymakers and stakeholders to view PFAS contamination as a domestic AND global issue. That is, agricultural lands less than one acre are equally important as those hundreds and or thousands of acres. The land is, wholistically, contributing to the mission of feeding our global community.

## Engaging minority-owned agriculturalists

Historically, many farms in the U.S. were operated by people of color (i.e., minorities such as Black, Asian, and Native American) although only 14% were run by people who identify as Black according to The United States Census of Agriculture report in 1920. The 1920 report also states there were 925,000 minority-run farms and 98% of southern state farms were owned by minorities. The 2017 report states the numbers have decreased with only 35,000 minority-run farms accounting for less than 2% of the farms in the U.S. The population increase coupled with the minority owned farm decrease is a concern if a system of sustainable agriculture and food security are a national and international goal. The effects of post-World War 1 and the enactment of Jim Crow Laws systemically excluded non-white agriculturalists from fairly contributing to the food supply market. Today, many non-white agriculturalists and enthusiasts experience effects of the discrimination of the past, and understandably, have no desire to actively engage in government-backed, government-supplemented, or government-influenced efforts to move feeding the country forward. But, many have committed to secure the lands of their ancestors, become stewards and agriculturalists of these lands, and farm these lands for their communities.

If we intend to assess PFAS contaminant and the overall impacts on agricultural lands, the inclusion of minority-owned agriculturalists is paramount. For those who own and cultivate in urban environments where the influence of varying anthropogenic sources can play a major role in vegetative germination is a parameter worth exploring. Additionally, understanding how environmental conditions and PFAS contamination may work in tandem to mitigate nutrient uptake by the vegetative species is equally a research area worth pursuing. In conclusion, how might geoscientists, environmental scientists, and agriculturalists work together to move this research to the forefront? Particularly for those minority-owned agricultural lands whose contributions are often forgotten.

References


1. https://www.nytimes.com/2021/01/31/climate/black-farmers-discrimination-agriculture.html
2. https://www.nass.usda.gov/index.php
3. https://extension.umaine.edu/agriculture/guide-to-investigating-pfas-risk-on-your-farm/#pfas-farmer-wellness-fund
4. Longsworth, S. G. Processes & considerations for setting state PFAS standards: The Environmental Council of the States. https://www.ecos.org/wp-content/uploads/2020/02/Standards-White-Paper-FINAL-February-2020.pdf
5. Post, G. B. Recent US state and federal drinking water guidelines for per- and polyfluoroalkyl substances. Environ. Toxicol. Chem. 2021, 40, 550– 563, DOI: 10.1002/etc.4863
6. Dana W. Kolpin, Laura E. Hubbard, David M. Cwiertny, Shannon M. Meppelink, Darrin A. Thompson, and James L. Gray. A Comprehensive Statewide Spatiotemporal Stream Assessment of Per- and Polyfluoroalkyl Substances (PFAS) in an Agricultural Region of the United States. Environmental Science & Technology Letters 2021 8 (11), 981-988, DOI: 10.1021/acs.estlett.1c00750
7. https://www.rd.usda.gov/files/RR194.pdf


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