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## Research Report

Between the end of the Civil War and the beginning of the Cold War American farmers came to rely on powerful chemical fertilizers. My dissertation examines the roots of the new agricultural regime in the United States, and argues that the modern crop system was not foreordained by the invention of new agricultural chemicals. Instead, it was the result of a host of historically contingent processes. To account for this agricultural transformation, my dissertation looks at a number of cases centered in the American South where the fertilizer industry found its first robust market in the United States after the collapse of slavery. There, farmers who cultivated staple crops like cotton and tobacco were the shock troops of a system of agriculture fueled by credit and off-farm inputs. The recourse to commercial plant foods entangled southern farms in a global economy of nutrients, the vulnerability of which became a major concern during both world wars. Fertilizer technologies came under the purview of the state during these periods of distress, when politicians and agricultural experts worked to bolster agricultural yields by framing food and fiber production as a weapon of war. The militarization of agriculture worked to the benefit of fertilizer manufacturers, who would also battle against New Deal technocrats that were determined to distribute cheap government fertilizer as an emancipatory technology for poor southern farmers. Even as debates raged about the meaning of this agricultural commodity, by the post-war era there was little doubt that it had become second nature on America's

farms and crucial to America's new program of agricultural diplomacy during the Cold War.

Generous assistance from the Harvard History Project and the Institute for New Economic Thinking gave me the opportunity to conduct a month of dissertation research in Washington, D.C. during summer 2013. I came to the archives with questions about how and why the American state became so involved in researching and promoting fertilizer application during the era of the World Wars. Before the First World War the project of promoting fertilizer inputs was mostly the job of fertilizer manufacturers—not state actors. My previous research in the records of The Fertilizer Institute had revealed that as early as 1909, the National Fertilizer Association had created its “Propaganda Committee,” specifically to expand the American fertilizer market with scientific data cherry-picked from state experiment stations and from the NFA's own in-house agronomists. Knowing that the federal government sought to ramp up agricultural production once war erupted in Europe, this summer I sought evidence that showed how and why fertilizer application became a state-led project, and not just an object of the private sector.

With these questions in mind, this June I sifted through through the General Correspondence of the Secretary of Agriculture (RG 16) and the Records of the USDA's Bureau of Plant Industry, Soils and Agricultural Engineering (RG 54) at National Archives II in College Park, Maryland. Some of my most valuable findings highlighted deep connections and tensions between the War Department and the USDA during and after World War I. Food production has always been a major concern for a nation at war, but it took on special meaning during WWI when the

mineral nitrates needed to fertilize plants were also in high demand for producing explosives and ammunition. For its part, Germany's more advanced chemical industry had found a way to "fix" atmospheric nitrogen to manufacture ammonia for explosives and fertilizer alike. (Confidential State Department memos I found in the Secretary of Agriculture's papers showed that Germany was able to pay part of its war reparations with nitrogen-rich ammonia in lieu of gold, a fact I have not encountered anywhere else.)

America was unable to keep pace with Germany's chemical industry during the war, but in 1919 the Secretary of War created the Fixed Nitrogen Research Laboratory [FNRL] to try to catch up. The correspondence of the FNRL in RG 54 held a bevy of useful evidence. For one, it showed an early instance of federal scientists and engineers working to push forward a more chemical intensive approach to agriculture through advanced research. Second, and even more surprising, was the extraordinarily cozy relationship between these federal employees and private fertilizer manufacturers. Most fertilizer industry trade journals from the 1920s and '30s project a hostile relationship between themselves and the federal government, in part because the Federal Trade Commission had investigated the industry on allegations of price fixing. In contrast, correspondence from the FNRL shows that federal employees handed over critical patents and free samples to fertilizer manufacturers practically free of charge. Not only did this federal largesse help fertilizer companies operate on a more advanced basis, it also gave the new chemical-powered approach to farming the imprimatur of the federal

government. These discoveries are going to form the kernel of a dissertation chapter, and hopefully, a journal article.

Another unexpected finding during my research related to fertilizer regulation during the 1920s and '30s. After the Civil War, state governments created their own departments of agriculture to help guarantee the quality of fertilizer products as a consumer protection. In the Deep South, in particular, these state-level regulatory programs were financed by inspection fees paid by fertilizer manufacturers. With this financial incentive in place, state departments of agriculture resisted calls for a national fertilizer law that would set nation-wide standards for the quality and grade of agricultural chemicals. In the records of the Bureau of Soils, I found evidence that showed cooperation between USDA officials and large fertilizer manufacturers who wanted to pass just such a national law to overcome the confusing patchwork of state-level regulations. I found it fascinating that southern state agricultural commissioners framed their resistance to the proposed national fertilizer law on the grounds that it was yet another “Yankee” assault on southern sovereignty. Southern agricultural commissioners argued that the proposed law would confuse manufacturers, reduce state revenues and act as “another encroachment on our few remaining state rights.”

At first blush, this seems to be a rather arcane regulatory turf war. But as recent events have shown, attempts to regulate fertilizer production, storage, and run-off through federal regulations have run aground on many of these same state-level regulatory regimes. This is a policy issue that remains unresolved in its current state, as is evidenced by events such as the explosion in West, Texas and the

annual eutrophication events in the Great Lakes and the nation's coastal waters.

This remains a pressing issue, and one that may have eluded my attention without help from the Harvard History Project and the Institute for New Economic Thinking.

Their assistance has played an invaluable role in moving my project forward.