Mapping Nutrient Cycling for Enhanced Efficiency Fertilizer

Executive Summary: Synthetic fertilizer and excess manure are disproportionately impactful emitters of greenhouse via Methane and Nitrous Oxide – which combined represent 16% of the total anthropogenic contribution to greenhouse gas emissions. Our project details for agricultural stakeholders and policy makers a new way forward via a detailed query of organic residual (manure) conversion as a replacement for synthetic fertility inclusive of environmental impact, costs, and logistics considerations.

Figure 2.2 — Breakdown of Methane and Nitrous Oxide Emissions[5]

Graphic Source: https://www.drawdown.org/solutions/nutrient-management
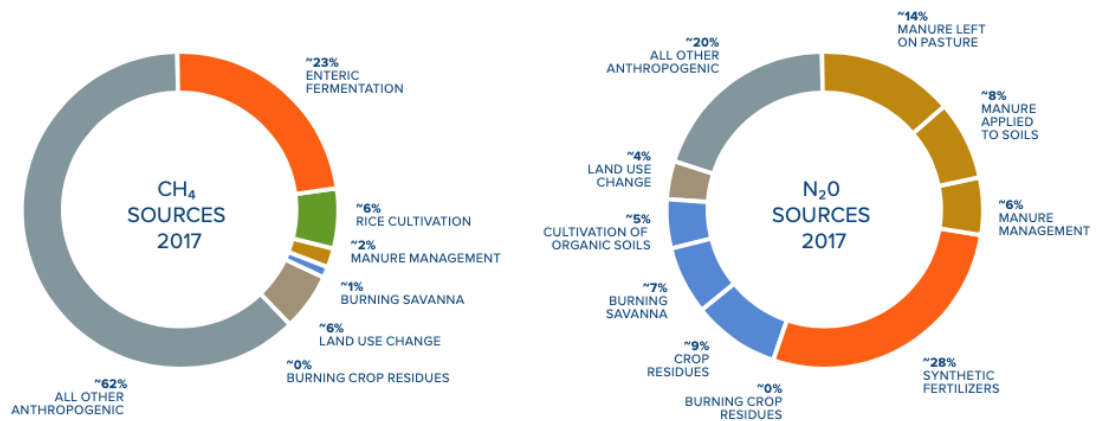
Scope: Our effort will assess county level estimates of nationwide (USA) organic residual manure sources from three types of animal agriculture: Confined animal feeding operations (hogs, chickens, turkeys) as well as large scale dairies and beef feedlots for nutrient cycling opportunities.

Objectives: *We will seek to:*
-ingest permitted facilities data using the census of agriculture and ARS manure shed tool[1]
- convert these quantities into value, sustainability (carbon) and value-based measures
- Ingest fertilizer use data around the country where nutrients are not currently overloaded
- Model, using operations research, the logistics and costs of transforming, transporting, and applying this fertility at these venues
- Visualize, articulate, and share our findings with industry to set the stage for incremental adoption

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[1] https://usdaars.maps.arcgis.com/apps/MapSeries/index.html?appid=881305934d62494bbbeeb5f36b735eb9