CENTER FOR
FOOD SAFETY

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Natural Resources Conservation Service
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**COMMENTS IN RESPONSE TO**
**NRCS'S REQUEST FOR INFORMATION ON THE IRA FUNDING PROGRAM**
**(DOCKET NO. NRCS-2022-0015)**

Center for Food Safety (CFS) appreciates the opportunity to common on NRCS's request for information on funding provided the Inflation Reduction Act (IRA). CFS is an environmental advocacy nonprofit dedicated to protecting communities and the environment from the harmful impacts of industrial agriculture. CFS represents over a million farmers, food workers, conservationists, residents, and consumers across the country. Greenhouse gas (GHG) emissions from industrial agriculture increases climate-related effects on the environment and public health. Our members have substantial interests in protecting nearby waterbodies, habitats, and communities from the harmful impacts of industrial agriculture operations, including the risks associated with rising GHG emissions. Our members also have an interest in protecting public participation in the decision-making process and ensuring that NRCS complies with its procedural and substantive duties in implementing its IRA funding program.

## STATUTORY REQUIREMENTS

On August 16, 2022, President Biden signed the Inflation Reduction Act (IRA) into law to address the climate crisis and reduce GHG emissions from industrial sources, including industrial meat and dairy operations and conventional monoculture cropping systems. In furtherance of this goal, the IRA provides $20 billion in additional funding for conservation programs administered by the NRCS. The IRA also provides $300 million to help NRCS accurately measure and evaluate carbon sequestration benefits and GHG emission reductions from funded activities. This new funding ensures that NRCS's IRA funding program supports activities that result in measurable GHG emissions reductions, soil carbon sequestration, and environmental co-benefits.

### *Conservation Stewardship Program*

The IRA appropriates $3.25 billion in new funding for the Conservation Stewardship Program (CSP) for FY 2023-2026. *See* 16 U.S.C. §§ 3839aa-21–25. In addition, the IRA directs NRCS to distribute this new funding based on specific climate-related criteria. NRCS can only spend IRA funding on agricultural practices "that the USDA determines directly improve soil carbon, reduce nitrogen losses, or reduce, capture, avoid, or sequester carbon dioxide, methane, or

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nitrous oxide emissions, associated with agricultural production." This added language limits the types of activities that qualify for IRA funding to ensure that funded activities result in direct and measurable reductions to GHG emissions from agricultural sources or soil carbon sequestration benefits.

***Environmental Quality Incentives Program***

The IRA appropriates $8.45 billion in new funding for the Environmental Quality Incentives *Program* (EQIP) for FY 2023-2026. *See* 16 U.S.C. §§ 3839aa–aa-8. Like CSP above, the IRA directs NRCS to distribute this new funding based on specific climate-related criteria. First, the bill waives the requirement that NRCS spend 50% of EQIP funds on livestock operations. With this change, NRCS can now use EQIP funding to support agroecological and organic farming practices that satisfy the targeting language of this bill (cover crops, reduced tillage, conservation crop rotations), regardless of whether they are livestock operations. The IRA also reauthorizes requirement that NRCS spend 10% of EQIP funds on practices supporting wildlife, 5% for Socially Disadvantaged Farmers, and 5% for Beginning Farmers and Ranchers, enforcing Congress's interest in supporting agroecological practices in historically excluded communities with widespread ecological benefits.

***Regional Conservation Partnership Program***

The IRA appropriates a total of $4.95 billion in new funding for the *Regional Conservation Partnership Program* (RCPP) for FY 2023-2026. *See* 16 U.S.C. §§ 3871-3871f. Like CSP and EQIP, the IRA directs NRCS to distribute this new funding based on specific climate-related criteria. The IRA states that NRCS can only spend RCPP funds on partnership agreements "that support the implementation of conservation projects that assist agricultural producers and nonindustrial private forestland owners in directly improving soil carbon, reducing nitrogen losses, or reducing, capturing, avoiding, or sequestering carbon dioxide, methane, or nitrous oxide emissions, associated with agricultural production." This added language requires that IRA funding support activities that will result in direct and measurable reductions to GHG emissions from agricultural sources or soil carbon sequestration benefits.

Based on the new climate-related requirements, Congress clearly intended for NRCS to issue IRA funding to agricultural activities that will result in meaningful reductions to overall GHG emissions, long-term soil carbon sequestration, and co-benefits for local communities. To fulfill these requirements, NRCS must implement its IRA funding program according to the recommendations and considerations discussed below.

## Responses by Question

### *(1) What systems of quantification should NRCS use to measure the carbon sequestration and carbon dioxide, methane, and nitrous oxide emissions outcomes associated with activities funded through IRA?*

CFS, along with many of our allies in the organic and sustainable agriculture community, urge NRCS to take a whole-systems, ecosystem approach when considering how to measure the GHG emissions or benefits of any practice, enhancement, or bundles of practices and enhancements. NRCS's emission estimation methodology must include a full lifecycle analysis of all emissions attributable to a particular activity, including direct and indirect emissions and cumulative emissions.

On the macro level, the EPA's estimate that U.S. agriculture contributes just 9.6% of the nation's overall emissions, in $CO_2$-equivalents, is a vast underestimate (EPA 2021, pp. ES-23). Experts increasingly object to the narrow scope of such estimates, and argue instead to consider the full contribution of the agriculture-food system, which amounts to 31-34% of global GHG emissions (Crippa et al. 2021, Tubiello et al. 2022), three-fold more. USDA should adopt the more expansive scope these authors recommend when assessing the GHG impacts of agriculture and practices to reduce it.

For instance, the nitrous oxide emissions of agriculture are largely due to the production, transport, application, volatilization, leaching and runoff of synthetic nitrogen fertilizer, but EPA's estimates in its latest GHG inventory (EPA 2021, pp. 2-21 ff.) appear to exclude production and transportation, which account for roughly 38.8% and 2.6%, respectively, of such emissions, at least on a world basis (Menegat et al. 2022). In other words, the already substantial GHG impacts of nitrogen fertilizer as conventionally understood become nearly twice as large if the GHG emissions from their manufacture (e.g. of ammonia from methane, and nitric acid from ammonia) and transport are included. Excluding production/transportation emissions has the effect not only of underestimating the climate change impacts of this backbone practice of industrial agriculture, but also of ***undervaluing the benefits of reducing synthetic nitrogen fertilizer use.***

For the range of parameters relevant to soil carbon and soil health more generally, CFS recommends that NRCS closely examine and learn from the design, conduct and results of the Soil Health Benchmarks Study spearheaded by the Pennsylvania Association for Sustainable Agriculture (PASA 2021). Farmers enrolled in the study have annual soil samples from their fields analyzed by Cornell University's Soil Health Laboratory for 10 soil health parameters[1] – physical, biological and chemical – and also keep detailed records of their cultivation practices. Changes in soil health parameters are correlated with field management practices, providing farmers feedback on the success or challenges they face in improving their farms' soil quality, and enabling course corrections as needed to change or hone practices.

A key feature of this successful program – which has received funding from the USDA Conservation Innovation Grants program – is the enlistment of farmers as active participants in

[1] The Cornell system has 13 parameters, of which 10 are tested in the PASA program.

the improvement of their soil, including increased soil carbon sequestration.  A second valuable feature is that the study brings together, and facilitates peer-to-peer learning among, farmers with very different production systems from across the state, thus enabling experimentation and innovation that might not otherwise take place.  Finally, the heavy participation of organic vegetable farmers in the study provides valuable insights into the soil health impacts of various organic practices in a group of farmers that is not well represented in past assessments of soil health or carbon sequestration.

We recommend one important revision to the protocols in this study.  Soil samples are taken to a depth of six inches (15 cm), which is insufficient to obtain a complete picture of soil carbon sequestration, particular in row-crop cultivation of field crops.  Instead, ***NRCS should insist on soil samples 60 cm deep to capture the differing soil organic carbon levels in various soil horizons***.  For instance, while no-till fields generally sequester more carbon than tilled fields in the surface horizon (roughly the top 10 cm, and sometimes down to 30 cm), tilled fields generally store more carbon at horizons > 30 cm, and often at soil depths below 10 cm; as a result, ***soil carbon levels do not differ between no-till and tilled fields,*** when the entire profile down to 60 cm is considered (Lal 2008; Baker et al. 2007).  It is hard to overestimate the importance of this methodological correction, given the (false) emphasis upon industrial no-till and reduced tillage production methods as a means for carbon sequestration and GHG emissions reductions.

Even to the extent that no-till production methods do provide benefits, most of what goes by the name is in fact *rotational* no-till, meaning that the relevant field is in fact tilled at no-till intervals of one to two years, with long-term continuous (> 3 or 5 years) no-till the exception rather than the rule (Hill 2001, Thaler et al. 2021).  The predominance of rotational no-till in ostensibly no-till or conservation tillage production systems likely helps explain why soil erosion rates have largely leveled out since 1997, despite somewhat increased use of reduced tillage system since that time (Freese et al. 2015).

While we understand NRCS is intent on developing metrics to enable more or less precise calculations of GHG emissions outcomes of various agricultural and conservation activities, for instance for integration into USDA's Greenhouse Gas Inventory and Assessment Program, we urge the Service to avoid the pitfalls of overgeneralization or underestimation.  Since GHG emissions and any reductions thereof often vary by soil properties and climate, among many other variables, NRCS must guard against extrapolating GHG emissions or reduction benefits from a narrow dataset involving for instance a particular region or soil type to the GHG outcomes for different regions or soil types.

Where uncertainty still reigns – "the estimation of GHG emissions from synthetic N fertilizer still holds large uncertainties, especially where emissions from use are concerned" (Menegat et al. 2022) – NRCS should guard against underestimation and instead base emissions projections that err on the side of environmental protection.

Any use of modeling should be carefully ground-truthed against ample empirical data sufficient to support the accuracy and scope of model predictions.

***(2) How can NRCS engage the private sector and private philanthropy to leverage the IRA investments, including for systems of quantification?***

NRCS should rely on the best available science to develop emission quantification methods. In general, NRCS should favor estimation methodologies developed by independent scientists without a financial incentive to favor particular production modalities over others. For instance, fertilizer manufacturers and pesticide-seed firms have obvious strong interests in making their products seem as environmentally benign as possible, and these financial interests may skew analyses they provide. NRCS should be as transparent as possible in developing GHG estimation methods, and shun any based on non-reviewable confidential business information provided by private interests.

***(3) How should NRCS target IRA funding to maximize improvements to soil carbon, reductions in nitrogen losses, and the reduction of carbon dioxide, methane, or nitrous oxide agricultural emissions?***

CFS urges NRCS to adopt the following priorities for Inflation Reduction Act funding:

1) ***Organic farming practices*** that provide large GHG emissions reductions and soil carbon sequestration benefits.
2) GHG-reducing practices that provide ample ***co-benefits*** for the environment and for communities adversely impacted by industrial agriculture, and that minimize detrimental effects.
3) ***Perennial plants and cropping systems***, such as grasslands and trees.
4) Conservation easements to ***permanently protect farmland*** from residential or commercial development.
5) ***Advanced forage and prescribed grazing*** for pasture-based livestock.

CFS strongly requests that IRA funding not be allocated to concentrated animal feeding operations (CAFOs) or to anerobic digesters used with them.

**Organic Farming**
In the 2018 Farm Bill, Congress recognized the vital importance of expanding organic agriculture by directing NRCS to provide a dedicated pool of funding for organic and transitioning-to-organic farmers. NRCS is also to provide appropriate technical outreach and technical assistance to organic producers, and to help them coordinate their organic certification process with participation in NRCS programs (NSAC 2020).

Proponents of mainstream industrial agriculture long adhered to a reductive conception of soil as a lifeless medium for provisioning plants with chemical inputs, and regarded the entire concept of "soil health" as unscientific. If life in the soil and soil health are today widely appreciated as critical aspects of productive agriculture, no small thanks are due to practitioners of organic agriculture, which is founded on the necessity of healthy soils for healthy plants.

*Soil carbon sequestration*
Organic farming builds soil organic carbon by use of three major practices: cover crops that protect soil in the off-season and enrich it with carbon when incorporated into the soil;

conservation crop rotations, which include one or more soil-building crops like a perennial grass or legume; and application of nutrients in organic forms like manure and compost rather than inorganic forms (Delate et al. 2015). Advanced crop rotations that include continuous living cover should receive priority for IRA funding. This would include perennial grain crop conservation rotation (CSP Code E328O) and winter annual oilseeds, among others.

In fact, there is now abundant evidence that organic farming practices – even those systems that involve frequent tillage (PASA 2021) – build carbon-rich soil, and do so better than vaunted no-till practices (Teasdale et al. 2007, Cavigelli et al. 2013). Conversely, most conventional no-till fails to achieve long-term soil carbon storage gains because it is not continuous, and periodic tillage of "no-till" fields results in extremely rapid loss of soil organic carbon and nitrogen as well as decreased soil aggregation (Grandy et al. 2006).

It may be that NRCS has insufficiently appreciated organic's superior performance in this respect versus no-till because it is committed to soil carbon measurements limited to the top 20 cm (8") of soil (where no-till tends to do relatively better), versus IPPC methods that assess the top 30 cm for carbon; and the French 4 per Thousand (4PT) initiative that measures carbon levels down to a depth of 40 cm (Chambers et al. 2016). Shallow sampling of soil (top 20 cm) for carbon levels will overestimate sequestration benefits of no-till and underestimate the carbon storage benefits of organic practices. NRCS should assess soil carbon levels in at least the top 60 cm of soil to obtain the truest possible picture of soil carbon sequestration.

NRCS should re-assess the efficacy of the practices under CSP Code 329: "Residue and Tillage Management; No Till," and in particular the two involving no till to reduce soil erosion (E329A) and to increase soil organic matter content (E329D) in light of these data. Are the putative soil improvements from these practices based on the assumption of continuous no-till (for 3, 4, 5 or more years) that in reality is seldom practiced? Are the putative soil carbon gains based on shallow (e.g. 20 cm) soil samples that do not reflect the true carbon sequestration effects, which require as discussed above deeper samples? CFS believes an objective evaluation of these questions would reveal that conventional no-till, as implemented by most producers, provides far less improvement in soil health, if any, relative to organic production methods.

In addition, recent studies show that organic nitrogen sources utilized in organic agricultural support higher levels of beneficial soil microbial life, such as bacteria and fungi, which make for healthier soils (Morugán-Coronado et al. 2022, Franzluebbers et al. 2022).

**Co-Benefits and Co-Detriments**

Because there are many agricultural pathways to reduce GHG emissions, it is entirely appropriate for NRCS to weigh the ***other*** impacts of such practices, both positive and negative, in deciding upon funding priorities. Organic farming prohibits use of synthetic fertilizers and pesticides, and thus avoids the damaging effects of these agricultural chemicals utilized in conventional systems, such as no-till.

For instance, the crop most intensively fertilized with synthetic nitrogen, corn, received on average 150 lbs/acre/year in 2021, or 13.36 billion lbs. on the 93.4 million acres of corn grown in that year (USDA NASS 2022).[2] These are the highest figures on record in U.S. history. As recounted above, nitrogen fertilizer has a huge GHG emissions impact. Another less well-known and often unaccounted impact is that intensive inorganic N applications accelerate microbial decomposition of organic matter, which over years leads to soils depleted of both soil organic carbon and soil-associated nitrogen (Khan et al. 2007). Farmers apply even more N to compensate, in a vicious spiral of rising inputs and declining soil quality. (This may help explain the futility of efforts to decrease nitrogen fertilizer use, from "precision agriculture" to extension service exhortations.) Moreover, only one-third of this nitrogen makes its way into the proteins and other nitrogen-bearing compounds in cereal grains (Mulvaney et al. 2009); the rest escapes into the air or water. Runoff into water creates dead zones in the Gulf of Mexico, Chesapeake Bay and other recipient water bodies. Leaching contaminates well water with toxic nitrates, a serious health threat in rural areas. These are all extremely serious "co-detriments" of conventional industrial corn production that NRCS should consider in making funding decisions and crafting conservation practices.

Two-thirds of corn in the U.S. was treated with over 60 million lbs. of atrazine,[3] an herbicide not used in organic systems (USDA NASS 2022). Mahia et al. (2008) found that atrazine primed two different soils with varying histories of atrazine use to sharply increase their breakdown of organic matter to carbon dioxide. This suggests that atrazine may contribute to climate change by speeding up the decomposition of organic matter to carbon dioxide, similarly to nitrogen fertilizers. Atrazine also impairs the reproduction of fish, amphibians and aquatic plant communities at extremely low levels. Many other biocides applied to corn make it the most environmentally damaging crop grown in the U.S.

Other co-detriments of industrial row-crop production systems include the huge 34% increase in overall agricultural herbicide use from just 2005 to 2012 (EPA 2017), reflecting the predominance of herbicide-resistant (HR) varieties in major field crops (corn, soybeans, cotton, sugar beets), the epidemic of herbicide-resistant weeds these HR crop systems have generated (Pucci 2018), and farmers' response to those weeds with increased use of multiple herbicides. The original glyphosate-resistant cultivars have now been largely replaced by crops resistant to dicamba as well as glyphosate. Historically unprecedented drift damage to crops triggered by post-emergence use of volatile dicamba on these Generation Two HR crops has also suppressed flowering of wild plants in rural areas, and thereby caused substantial drops in honey production and undoubtedly great harm to other pollinators (Gross 2019); and wrought considerable damage to orchards and rural trees in general. The damage was so severe and EPA's misregulation so egregious that a federal court revoked the EPA registrations for post-emergence use of dicamba on resistant crops in 2020 (CFS 2020a). EPA re-instated the registrations just months later, leading to continued destructive dicamba drift (CFS 2020b) and ongoing litigation to get it off the market once and for all (CFS 2020c).

Climate mitigation funding would be better spent on organic production systems that eschew these chemicals, providing co-benefits rather than co-detriments, and biological integrated pest and weed management systems that resort to pesticides only as a last resort.

[2] USDA NASS reports just 12.3 billion lbs., but this amount applies only to Program States, which comprised 92.1% of total corn acres surveyed in 19 corn-growing states in the U.S. that year (USDA NASS 2022). 13.35 billion lbs. (12.3/0.921) is the best available estimate for synthetic N use on total corn acres.

[3] Similarly, normalizing atrazine use of 59.1 million lbs. on 92.1% of U.S. corn acres yields 64.2 million lbs. on total corn acres.

Approaching climate mitigation strategies with these broader ecological goals in mind ensures that farmers are not only reducing their climate-change forcing impact, but also building resilient production systems that will protect them from changing climate patterns and provide environmental and public health benefits.

**Perennial Plants and Cropping Systems**
Perennials should be incentivized on all marginal, highly erodible, and otherwise ecologically sensitive cropland. The soil lost in producing annual crops on these lands equates to soil carbon lost, in addition to other ecologically detrimental effects. Perennial production, on the other hand, not only holds soils in place, but results in deep extensive root systems and woody biomasss that can contribute substantially to assist with carbon sequestration (Biardeau et al. 2016). In a global review, Ledo et al. (2020) found an average 20% and 10% increase in soil organic carbon in 0-30 cm and 0-100 cm soil horizons, respectively, over 20-year periods encompassing conversions from annual to perennial crop systems.

Agroforestry shows particular promise for soil carbon sequestration, integrating trees into cropland via alley cropping or into grazing systems with silvopasture, and offers many co-benefits (FBLE 2022). Trees have the additional advantage of creating aboveground biomass whose carbon sequestration is more readily measurable.

**Permanent Farmland Preservation**
Eleven million acres of farmland were converted to urban or low-density residential uses from 2001 to 2016 (Freedgood et al. 2020). Such developments create huge GHG emissions. Agricultural Conservation Easement Program funds should thus be used to preserve as much farmland as possible from development. The co-benefits here are substantial, and include support for farm families and rural communities.

**Animal Agriculture**
*High quality forage*
Reducing GHG emissions from livestock means reducing emissions from both the system as a whole and from livestock enteric emissions, which comprise 25% of U.S. agriculture's direct GHG footprint. Maintaining high quality forage through sound rotational grazing tends to reduce the amount of methane emitted per animal per day, and per unit meat or milk production by 30% or more (Wang et al., 2015).

*Optimizing timing of grazing*
Brief intensive grazing of forage at the latter part of the rapid growth phase, followed by adequate recovery time, maximizes the root exudation and formation of persistent, mineral-associated organic matter (MAOM) (Prescott et al., 2021). Grazing too early or too late reduces net carbon sequestration, grazing too late can reduce forage quality and increase enteric $CH_4$, and grazing schedules that are not optimized for locale may explain reports of low or no C sequestration in rotational grazing systems.

*Concentrated animal feeding operations (CAFOs)*
None of the NRCS funds appropriated by the Inflation Reduction Act should go to concentrated animal feeding operations (CAFOs). All too much past funding, for instance from the Environmental Quality Incentives Program (EQIP), has gone to such operations, in a vain

attempt to ameliorate their many harms – from nutrient overloading of local waterways and the environmental havoc this wreaks, to volatilization of ammonia and other noxious gases from manure lagoons and associated GHG emissions, as well as unbearable odors local residents must bear, to contamination of neighboring vegetable farms with pathogenic bacteria, resulting in massive food poisoining outbreaks (Glibert 2020). Most insidious is that the conservation funding which subsidizes these noxious operations helps them to undercut small dairy farms that are far more sustainable, and which are disappearing at a tremendous rate across the country (Gurian-Sherman 2008, Lawson 2004). The decline of small to mid-size family dairy farms thanks in part to the rise of CAFOs also undermines their rural economies and communities, one more blow to rural America.

We are pleased to note, first, that for the purpose of EQIP IRA funds, Congress waived the 50% set-aside for livestock practices that normally applies to EQIP. This demonstrates Congress's clear understanding that EQIP has been far too heavily focused on livestock operations like CAFOs; and indeed, others have faulted the program for the paucity of support to soil health initiatives (Basche et al. 2020; Gewin 2021).

*Anaerobic digesters*

We also welcome NRCS's decision to remove two Livestock Partnership climate change mitigation practices from its list of 2023 climate-smart agriculture and forestry (CSAF) mitigation activities for fiscal year 2023: Conservation Stewardship Program (CSP) Code 366 for Anerobic Digester and 632 for Waste Separation Facility (NRCS 2022). We urge NRCS to continue to deny funding to these CAFO-facilitating practices, whether under CSP, EQIP or some other program, in future years as well.

Anaerobic digesters are a false climate solution for mega-dairy operations that are significant greenhouse gas emitters. GHG reductions attained with high-cost digesters are exceeded by the overall GHG emissions of the CAFO system as a whole, given its dependence on GHG-intensive fertilizers, pesticides, shallow-rooted annual crops, tillage, transportation, and more, that are often unnecessary with more integrated crop-livestock systems. Rather than installing digesters, CFS advocates support for alternative manure management practices and pasture-based systems of animal husbandry and crop-livestock integrated production systems.

## ACCESS TO FUNDING

NRCS should increase outreach, training, and education in historically excluded communities to ensure producers in these communities are aware of funding opportunities and best practices. NRCS should also coordinate with agencies administering funding to new, underrepresented producers to ensure these producers have the opportunity to adopt climate solutions from the start, instead of investing in false solutions that entrench the oil and gas industry and increase production and mitigation costs in the long run.

NRCS should also make information about its IRA program, including information on funded projects, available to the public, in multiple languages. This will ensure that producers have the information they need to determine what types of projects are most likely to receive funding under the IRA program (based on agency data on funding recipients), and which projects are most likely to improve climate outcomes (based on reported data from funding recipients). In addition to empowering producers to plan for the future and improve their own activities, this information will enable community groups and advocates to identify false solutions, increase efficiency and accountability in funding activities, and enhance climate mitigation and preparation efforts at the local, state, and federal level.\

CONCLUSION

NRCS should prioritize IRA funding for organic and agroecological practices, which result in measurable GHG reductions, increased soil carbon sequestration, and other environmental co-benefits, including increased water and air quality, enhanced biodiversity and ecosystem functioning, and public health benefits to impacted and disadvantaged communities. NRCS should ensure that IRA funding does not go toward false climate solutions, such as large-scale concentrated animal feeding operations or anaerobic digesters for use with them. NRCS should share regular updates about the development of its IRA funding program and keep the public informed throughout the decision-making process.

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