Attachment B

Scope of Work

Task 1: Climate-smart agricultural practices tracking system

A. Practice Identification

   a) The UMass Team will identify *uses* of agricultural land that have the greatest potential to respond to practice changes by increasing carbon sequestration and/or decreasing GHG emissions according to initial literature review and expert knowledge. The resulting land uses – a subset of all agricultural land management categories in Massachusetts – will determine the scope of remaining steps, with the intention to capture at least 70 percent of potential improvements in the agriculture sector that could be feasibly implemented by 2030 with sufficient incentives. Other agricultural land uses that generate significant GHG but may be more challenging to address in that timeframe will be noted. The final list will reflect both internal analysis and consultation with relevant agencies. We anticipate that hay, dairy, and beef operations are likely to be prioritized due to large acreage in aggregate and on a per-farm basis, and relatively well-established options for climate-smart management practices.

   b) Within the target land uses, in-depth exploration of common management *practices* currently employed and alternative climate-smart management practices will be conducted. It will be important to address both baseline practices now in use and alternative practices, in order to comprehensively address farm management needs and customize the analysis to Massachusetts farms. The analysis will not comprehensively address all practices, but will prioritize the individual and/or clustered practices that have the greatest feasibility in relation to adoption and climate impact. A table of practices will be cross-referenced with NRCS' Climate-Smart Agriculture and Forestry Mitigation Activities List and methodology documentation from the literature and related applications such as COMET-Farm and CaRPE, as well as to key state planning documents including the Healthy Soils Action Plan, to ensure clarity as the project proceeds to address tracking and impact estimates. Practices that generate significant GHG but would be more challenging to address by 2030 will be noted.

   c) UMass Deliverables:

      i)   A list of agricultural land uses selected for further analysis and justification for their selection, as well as other agricultural land uses with significant but difficult-to-abate GHG emissions and explanation of these challenges.

      ii) A table of selected practices that are relevant to the selected land uses including a description of each practice, with a rationale for inclusion and references to identical or related practices from other key source documents. The table will also list and provide explanatory notes on applicable practices from NRCS' list, or that are otherwise noteworthy with regard to GHG, but that may be more difficult to implement or assess.

B. Tracking System Development

   a) The UMass team will include in its literature review a search for adoption tracking systems that are in use or proposed in other jurisdictions. These may include farm-level tracking of program participation, responses to surveys and the Ag Census reporting practice implementation, remote sensing tools, sample-based estimation, and other methods. Staff at MDAR will be consulted for feedback on the workability of these systems in Massachusetts. The UMass team will not design a system for agency implementation, but will assess advantages and disadvantages of a variety of approaches and, where appropriate, make recommendations.

   b) UMass Deliverable: Review of adoption tracking options with pros and cons, summary of MDAR input, and implementation recommendations as appropriate.

Task 2: GHG assessment of cropland and grassland management

A. Practice-based Estimates

   a) The UMass team will develop estimates of the potential GHG emissions impacts of applying the practices identified in Task 1.A. in Massachusetts, on a per-unit-area and aggregate statewide basis. Scenarios will include current adoption, maximum feasible adoption, and 20 percent adoption consistent with Clean Energy and Climate Plan goals. Practices may be evaluated individually and/or in logical clusters. Initial estimates will be derived from existing tools such as COMET-Farm, COMET-Planner, and CaRPE. Significant effort will be devoted to critiquing the initial estimates based on expert knowledge of Massachusetts farms and practices, and review of the literature supporting these tools and other sources. Based on this critique and consultation with experts, the UMass team will develop refined ranges and/or confidence intervals intended to more accurately reflect GHG emissions and sequestration potential based on current knowledge.

   b) For a selection of the most widely applicable and/or GHG beneficial practices, the UMass team will also conduct a qualitative assessment of co-benefits and disbenefits, considering effects on soil health, farm productivity, farm resilience, economics, climate adaptation, public health, and other environmental factors.

practices, emissions estimates, confidence assessments, and co-benefit/disbenefit assessments where applicable, as well as a memo describing the methods, sources, and significant findings of this analysis.

B. GHG Inventory Improvements

   a) The UMass team will research the potential of the above-described body of work to inform the larger effort to improve the GHG inventory and report Massachusetts emissions and sinks. Wherever feasible, the team will obtain and/or calculate emissions estimates disaggregated by agricultural land use or management category, emissions and carbon stocks per unit area in relevant land classes, and estimates of statewide area in significant agricultural land use/management classes. As necessary, the UMass team will reach out to EPA, USDA, and EOEEA staff to understand current inventory methodologies and develop crosswalking approaches between approaches. These analyses will be limited to the selected land uses and practices already analyzed, and will therefore not provide a comprehensive approach to estimating emissions and sinks for the entire agricultural sector. The team will also make recommendations for future efforts to improve the inventory process for the sector.

   b) UMass Deliverable: A report package containing updated data and calculations pertaining the GHG inventory implications of the land uses and practices analyzed over the course of the project, as well as relevant recommendations that can contribute to a roadmap for implementing comprehensive inventory improvements.

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