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Project Abstract

Using Remote Sensing-Based Measures to Assess NRCS Impacts in Michigan- Step 2

Agricultural landscapes represent a large proportion of the United States, amounting to 938 million acres of U.S. land (nearly half of all land) for the 48 contiguous states according to the 2002 Census of Agriculture; of this acreage, about 400 million acres are cropland (roughly 20 percent of all land), with the Census and the National Resources Inventory (NRI) offering slightly higher and lower estimates, respectively. These landscapes are dynamic in nature, and this presents a unique challenge for assessment through remote sensing. Nonetheless, many remote sensing-based techniques have been developed, and are being developed, to address land management needs for these agricultural landscapes. These techniques are being applied for mapping and monitoring both agricultural land and the landscapes surrounding agricultural land. Furthermore, these efforts have been supported by NASA to further the development of advanced agricultural remote sensing techniques, and the proposed project seeks to build upon these past efforts linking NASA and the United States Department of Agriculture (USDA). Specifically, this project, proposed by Altarum Institute and the University of Michigan, will use satellite imagery and NASA-derived data products to assess the impacts of farming programs administered and managed by the USDA's Natural Resources Conservation Service (NRCS). The study area will consist of agricultural lands in Michigan, predominantly in its Lower Peninsula. Furthermore, this project will contribute significantly to efforts to understand the ecological impacts of agriculture and sustainable agricultural practices and will build on an existing cooperative agreement between Altarum Institute and the Michigan office of USDA NRCS. The main goal of the proposed activity is to develop and employ remote sensing based analyses to make county-level assessments of inputs to the environmental quality index (EQI) currently under development by Altarum for use by MINRCS program managers. Some of the methods and products we propose are established, while others will require some level of development to bring the processes out of the research realm to provide real-world solutions for NRCS. The latter activities will be further scrutinized within the proposed project to ensure that the effort needed to produce results has significant real-world value or to provide a critique of its eventual utility for NRCS program assessment. Long established remote sensing systems will be used to provide information on the retrospective study (e.g., Landsat and SPOT). Newer established sensors (e.g., MODIS and ASTER) and experimental sensors (e.g., Hyperion) will be used to provide information not available from the more traditional sensor systems. The proposed work has two primary objectives: (1) Employ remote sensing-based techniques to provide inputs to the NRCS Program Implementation Measures component of Altarum's NRCS evaluation framework and to develop independent (non-NRCS-based) measures and indicators of ecological health to serve as inputs to the Environmental Quality Measures component of the framework. (2) Conduct land-cover and land-use change analyses based on remotely sensed data to assess the ecological consequences of changes in land outside the NRCS program activities that may be confounding influences in the evaluation of conservation outcomes.