

Natural Resources Conservation Service | Plant Materials Program

2023 Climate Smart Agriculture Activities



Overview

In October 2021, the NRCS Plant Materials Program established a Climate-Smart Agriculture Action Plan. Congress appropriated \$1 million to the fiscal year (FY) 2023 Plant Materials Program budget for climate related activities. This report provides an overview of the Plant Materials Program’s FY 2023 activities and accomplishments supporting NRCS climate change goals in agriculture and forestry.

Plant Materials Program Goals and Activities

NRCS’s network of 25 Plant Materials Centers (PMC) is uniquely positioned to support the climate smart vegetative conservation practices needed by NRCS and our conservation partners. Climate change has the potential to change the currently accepted range of adaptation for NRCS conservation plant releases. Conservation plant materials used in areas where they are not well adapted can lead to decreased agricultural productivity, decreased water quality, stress on public lands and decreased ecosystem resilience to extreme climate events.

Many conservation plants released by PMCs have been in use for decades and their areas of use are well known. Enhancing the climate literacy of conservation planners through selection of appropriate species and varieties to match the climate or projected climate is essential. The

technology and methods used to establish and manage conservation plants are equally important, as well as potential changes to established procedures to adapt to changing climates. PMCs have accelerated developing vegetative information and training for field staff to meet emerging environmental challenges associated with climate change.



Adaptation and performance evaluations of Plant Materials Program conservation plant releases in Booneville, Arkansas

Goal 1: Compile plant characteristics and adaptation information for existing conservation plants to determine their tolerance to projected climate changes and extreme climate events.

- PMCs from coast to coast are evaluating the adaptation and performance of conservation plants to prepare for potential changes in conservation plant recommendations due to projected climate change. For example, the PMC in Corvallis, Oregon, is evaluating various novel forages for adaptability and performance in irrigated and non-irrigated settings, while the PMC in Cape May, New Jersey, is exploring alternative, value-added crops for marginal coastal production areas.
- PMCs are also actively engaged in evaluation of cover crops to ensure that producers have the latest information on productivity and management considerations. For instance, PMCs in Tucson, Arizona; Nacogdoches, Texas; and Americus, Georgia, recently completed a study evaluating the growth and cover of black oats and black seeded oats (two popular cool season cover crops) to supply information to not only producers, but also to erosion prediction models.

- The PMC in Ho'olehua, Hawaii, developed the [Rainfall Sufficiency Tool](#) to give planners a monthly approximation of the probability of sufficient rainfall to establish forage grass plantings and to help users understand associated risks.
- At the PMC in Rose Lake, Michigan, a study evaluating and comparing the growth characteristics and production attributes of 16 varieties of cereal rye was conducted to help inform producers and conservation planners which varieties of cereal rye are most suitable for use in the region.



Plots of cover crops in Puerto Rico

- Puerto Rico NRCS currently recommends tropical or warm season cover crop species, although they do list radish and leaf mustard for use in the dry season. These same species are considered winter cover crop species in the Coastal Plain of the United States, which suggests other “winter” cover crop species specifically bred for the Southern United States may also be useful for Puerto Rico producers. The PMC in Brooksville, Florida, is assisting NRCS staff in Puerto Rico to determine the adaptation of selected black oat, common oat, triticale, and cereal rye experimental lines and southern cultivars as cover crops for Puerto Rico.
- PMC staff in Bismarck, North Dakota, are conducting long-term evaluation of woody species to screen options for Northern Great Plains windbreaks. The new entries in 2023 were Norway spruce and northern catalpa. Depending on performance and adaptability, these species could provide additional conifer or tall deciduous trees for climate smart windbreaks.



Northern catalpa was added to the tree and shrub evaluation plantings in Dickinson, North Dakota and Brookings, South Dakota.

Goal 2: Target new plant selection efforts to increase adaptability and resiliency for climate smart natural resource conservation to ensure sustained ecosystem diversity, especially in ecosystems most at risk, such as high altitudes and coastal areas.

To increase adoption of regionally adapted cover crops, PMCs in Georgia, Idaho, Kansas, Missouri, Oregon, Texas (Knox City), and Washington are working cooperatively with a [Cover Crop Breeding Network](#) consisting of Land Grant Universities and USDA Agricultural Research Service (ARS) scientists to develop new varieties of hairy vetch, winter pea, and crimson clover. Two new cultivars of hairy vetch will be released to commercial growers soon.

PMCs have selected and released 759 conservation plants over the past 80 years, of which 565 are active and commercially available today. These plants are used to support conservation practices that stabilize soil, improve pollinator and wildlife habitat, provide livestock forage, and increase the diversity in conservation plantings. All PMC plant releases support NRCS conservation activities on private lands as well as the [National Seed Strategy](#), a Federal interagency effort to select appropriate plants for restoration and conservation on both public and private lands.

While there were no new conservation plant releases from the Plant Materials Program in 2023, several PMCs have ongoing evaluations of promising plants.

- The PMC in Kingsville, Texas, is evaluating Engelmann’s daisy and Maximillian sunflower to add pollinator plant diversity in seed mixes.
- The PMC in Bismarck, North Dakota, is working with South Dakota State University in evaluating collections of plains muhly, a native warm season perennial grass, for livestock forage and wildlife habitat on marginal lands in response to ongoing climate change in the Northern Great Plains.
- The PMC in Corvallis, Oregon, is investigating springbank clover, a native clover, for forage and as a cover crop in Oregon and California, and the PMC in Pullman, Washington, is evaluating sainfoin as an alternative hay and forage crop in the Inland Northwest.
- The PMC in Aberdeen, Idaho, is using field evaluations and genetic analysis to develop a release of curlycup gumweed to enhance wildlife habitat and improve seed mix diversity in conservation plantings.



Winter pea and cereal rye at the PMC in Americus, GA. PMCs are cooperating with other state and Federal agencies to develop hairy vetch, winter pea, and crimson clover crop cover varieties for soil health.



Curlycup gumweed flower

Goal 3: Evaluate establishment technologies and management strategies for plant materials subject to increased climate stressors and extreme climate events to reduce the risk of failed conservation plantings.

Producers are on the front lines of climate change, facing changes in temperature and precipitation patterns and more frequent and intense events such as floods, droughts, hurricanes, and wildfires ([USDA-NRCS Climate Change Adaptation Plan](#)). Plant Materials Program staff nationwide are evaluating the ability of conservation plant releases and other commercially available materials to be used in unconventional ways and still meet the goals of a conservation planting. For example, the PMC in Coffeerville, Mississippi, completed a study evaluating the [performance of four annual cool season grass species](#) based on planting and termination date combinations to identify best practices for cover cropping standards. As studies like these are completed, information developed will be incorporated into NRCS Field Office Technical Guides across the country. Other PMC activities include the following.

- At the PMC in Knox City, Texas, a multi-year evaluation was completed comparing the [biomass produced by five cool season legumes](#) grown at differing seeding densities. The information obtained allows management decisions to be made that maximize the benefit of the cover crop at the lowest cost to the grower.
- A study to test a variety of land preparation methods (such as tillage vs. herbicide treatment vs. burning) to establish perennial pollinator habitat and determine the impact on soil carbon sequestration is ongoing at the PMC in Booneville, Arkansas.



Little bluestem plots in Lake City, Indiana, in June 2023

- Grazing systems, including both pastures and rangelands, require information on the best adapted species and management techniques to maintain and improve productivity, especially under abnormal climate conditions such as drought or increased precipitation. For example, the PMC in Elsberry, Missouri, is conducting comparative evaluations of a little bluestem selection to commercially available cultivars in different climatic zones in Missouri, Iowa, and Illinois to identify a better adapted little bluestem for conservation plantings.
- In Montana, the Bridger PMC is finalizing a dryland study addressing early successional species, seeding rates, and seeding timing in a cheatgrass-infested area to develop methods to address invasive species.



PMC staff in Bridger, Montana, establishing a trial to evaluate options for addressing invasive species that interfere with conservation plantings.

Goal 4: Use PMC locations and information for outreach, training, and the development of documents and tools to improve the climate literacy of conservation planners and partners and broaden the access and availability of conservation plant related data.

PMCs have a wealth of information as well as the ability to demonstrate plants and vegetative practices at their locations and in off-PMC plantings. The transfer of new technology is a core function of PMCs and is critical to providing climate smart information to conservation planners and the public. Demonstration plantings, training for conservation planners, and development of technical documents provide first-hand knowledge of how plants are adapting because of climate change, as well as which plants will address natural resource concerns in different environments.

Technical training for conservation planners, producers, and the public is critical to improving climate literacy and to increasing the resiliency of conservation plantings. In 2023, Plant Materials Program staff conducted 63 technical training sessions for over 2,582 field staff and conservation partners. PMCs also provided field days, tours, and presentations to 6,400 participants including NRCS employees, Federal and state government employees, farmers, ranchers, and the public. Some examples include the following.

- The PMC in Elsberry, Missouri and the NRCS Soil Health Division launched a cooperative effort to deliver a hugely successful course on “Advanced Cover Crops for Soil Health Specialists.” The training is planned at two additional PMC sites in FY 2024.
- PMC staff in Big Flats, New York, hosted “Tree and Shrub Establishment Training” for 40 NRCS, Farm Service Agency, and Soil and Water Conservation District staff. The participants completed a hands-on exercise that entailed proper planting techniques of live stakes, seedlings, and rooted cuttings of various ages, and installing different protection methods for successful establishment.
- The PMCs at Pullman, Washington, and Fallon, Nevada, hosted participants in multiday Soil Health trainings. Conservation planning field staff received information on soil health principles, cover crop planning, selection, and management, as well as hands on experience completing the infield soil health assessment and creating a soil health management system plan.
- PMC staff in Beltsville, Maryland, provided training for over 100 NRCS staff on pollinator plant identification, grazing and pasture plant identification, and establishing pollinator plantings.



Participants at the Advanced Cover Crops for Soil Health Specialists pilot course in Elsberry, Missouri, evaluating seeding efficacy



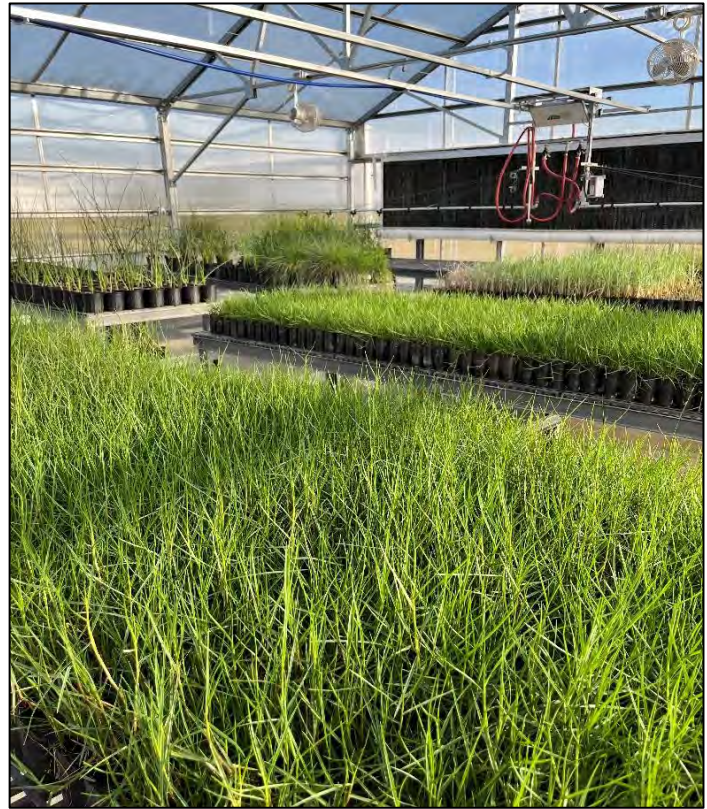
A field day at the PMC in Los Lunas, New Mexico

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Goal 5: Improve the sustainability of Plant Materials Centers.

PMCs comprise the majority of the NRCS-owned real property portfolio. When possible, the Plant Materials Program strives to reduce energy use and optimize water efficiency to meet Federal facility management requirements. Notable facility improvement projects at PMCs include

- improving the efficiency of building components by replacing them with EnergyStar or other energy efficiency units, such as the HVAC system at the PMC in Beltsville, Maryland; the hot water heaters at the PMC in Big Flats, New York, and Cape May, New Jersey; and the seed cooler dehumidifier at the PMC in Coffeeville, Mississippi;
- capitalized building improvements for increased sustainability, such as the PMC in Hoolehua, Hawaii, contracting to redesign their equipment storage building roof to ensure that it is up to code with specifications for greater resiliency to high winds;
- improving water use efficiency, such as the PMCs in Nacogdoches, Texas, replacing a leaking domestic water line; and
- removing hazardous trees around critical PMC facilities at Brooksville, Florida; Big Flats, New York; and Lockeford, California, to make the buildings and infrastructure more resilient to storms.



Coastal stabilization plants in the new energy-efficient greenhouse completed in 2023 at the PMC in Galliano, Louisiana

Sustainability improvements at PMCs also extend to field and operational activities. Most PMCs have integrated cover crops in fallow areas to improve soil health and prepare fields for future studies and demonstrations. Upgraded farm equipment improves fuel use in our field activities. Integrated pest management is stressed to optimize or reduce pesticide use when possible.

Investments in Climate Related Activities

In FY 2023, the Plant Materials Program invested over \$1.1 million in climate smart activities to support NRCS conservation planning and delivery and to improve the efficiency of PMC facilities.

Action Plan Goal	Investment
Climate Smart, Goal 1	\$567,585
Climate Smart, Goal 2	\$87,651
Climate Smart, Goal 3	\$211,841
Climate Smart, Goal 4	\$75,314
Climate Smart, Goal 5	\$187,836
TOTAL	\$1,130,228

For More Information

Additional information on the Plant Materials Program, activities, conservation plants, and technical resources is available on the [Plant Materials website](#).

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