

Harry R. Hughes Center for Agro-Ecology



Hughes Center Board of Directors



Harry R. Hughes
CENTER FOR AGRO-ECOLOGY



COLLEGE OF
**AGRICULTURE &
NATURAL RESOURCES**

● Founded in 1999

501(c)(3) nonprofit affiliated with the University of Maryland, College of Agriculture and Natural Resources

● Mission

Provide leadership to promote environmentally sound and economically viable agriculture and forestry as Maryland's preferred land use through research, outreach and collaboration.

● Focus Areas

The Center works toward achieving its mission through a three-pronged approach of scientific research, policy analysis, and outreach and education efforts.



Research

- Focus on agriculture, forestry and the Chesapeake Bay
- Current research focuses on critical issues, including:
 - Ag and Water Quality BMPs
 - Carbon Storage
 - Foodshed
 - Forests/Woodlands
 - Saltwater Intrusion
 - Oyster Aquaculture



Policy Analysis

- Evaluate the effectiveness and potential impacts of policies in Maryland.
- Examples include:
 - Maryland Forest Technical Study
 - Chesapeake Foodshed Assessment
 - Upcoming: Roadmap to Resilience: A Report on Maryland Climate-Smart Agriculture



Outreach

- Common Ground, Strategic Partnerships, Collaborative Advancements
- Examples include:
 - WIP Workshops
 - Forest Action Plan workshops
 - Nutrition Benefit Program workshops
 - Scientific research outreach

Maryland Climate-Smart Agriculture: Roadmap to Resilience



Provide Maryland, its farmers and the agricultural community with scientific and real-world recommendations to assist them responding to climate change.

Recommendations stem from two sources:

- **Research** team evaluated potential impacts on ag.
- **Outreach** with farmers and service providers about their observations, questions, ideas on challenges and opportunities of climate change.





The Process

- **State-funded project organized by the Hughes Center**
 - Framework in a 2021 Prep Study
 - Funded during the 2022 legislative session
- **Diverse Project Leadership Team:**
 - Farmers
 - State agency representatives
 - Conservation and academic partners
- **Stakeholders are critical. Recommendations must be useful & actionable.**
 - Listening sessions across MD
 - 35+ interviews with partner farm organizations
 - 220+ people reached in stakeholder survey
- **Investigation on climate's current and future impacts on MD agriculture**
 - A team of multidisciplinary scientists from the UMD, UMES and UMCES assessed the current and future impacts of climate change on agriculture in Maryland.

What is Climate-Smart Ag?



Climate-Smart Agriculture (CSA) is a set of agricultural practices and technologies that work simultaneously to:

- Produce more high-quality food without putting additional strain on natural resources;
- Increase the agricultural sector's resilience in the face of climate-related risks; and
- Reduce or offset GHG emissions and increase carbon sequestration in agricultural lands.

Uses many current tools and techniques but systematically evaluates BMPs with the best available science to respond to challenges.

There is much to be proud of in Maryland's efforts to build resilience to shifts in climate. This report builds on current Maryland policy efforts and encourages agriculture to be systematically integrated into those efforts and plans.

WHAT THE FUTURE HOLDS IN MARYLAND:

MORE HEAT:

POTENTIAL HEAT STRESS FOR PLANTS AND ANIMALS, SHIFTING PLANT HARDINESS ZONES, NEW INVASIVE PLANTS, AND PESTS.



more days above
86°F by 2026.



Avg annual temp has risen
4–5°F in the last 63 years
*(5–10°F higher by the end
of the century).*



Longer, more extreme
heat waves.



Declining corn productivity with
more yield limiting heat days.



28

more nights *above*
68°F means less
cooling relief from
heat stress to both
crops and animals.

DUMP AND DRY CONDITIONS:

DAMAGING STORMS, INCREASED IRRIGATION NEEDS,
FAVORABLE CONDITIONS FOR DISEASES AND PESTS.



3.5" more annual rainfall = wet conditions and increased blights, rots, and other diseases.



More intense rainfall and damaging storms, causing erosion and runoff.



More frequent droughts — reducing crop yields and increasing irrigation needs.

SALTWATER INTRUSION:

AGRICULTURAL LAND UNABLE TO SUPPORT CROPS.

31,462 acres affected by 2050 and 43,283 acres by 2070.



What Producers Currently See

- Drought followed by extensive rainy periods and varying storm intensities
- Mid-Atlantic sea level rise
- Impact from increases in major weather events like hurricanes
- Pest, disease and wildlife pressure
- Heat stress in crops, animals and workers
- General loss of agricultural land (energy infrastructure, saltwater intrusion, development, etc.)





What Farmers Say They Need

- Information on best strategies to use to maintain profitability
- Financial support for adaptive measures
- Farmer education on practices
- Landscape of regulations, assistance programs and resources need to be in “one-stop-shop.”
- Technical support
- To be heard on renewable energy/land use concerns
- New heat-tolerant varieties needed
- Stormwater runoff management
- Planning for extreme weather events
- Conservation and cost-share options

Recommendations and Key Messages

- **Adopt climate-smart agriculture and agroforestry statewide** to help increase farm productivity, food system resilience, and to leverage the co-benefits and ecosystem services CSA practices provide.
- **Evaluate and support adaptive management practices to achieve CSA** (e.g. , crop diversification, heat or pest-resistant crops, salt-tolerant crops).
- **Integrate agriculture into state planning as a response to climate change**, ensuring it remains both economically viable and environmentally beneficial. MD's goals for climate, energy, water quality, forests, agricultural production, etc., need to be **integrated and implemented strategically**.
- **Build an early warning system of climate impacts on ag** to alert producers to conditions that will compromise or disrupt ag productivity.
- **Create a one-stop shop** for farmers seeking information.
- Evaluate and expand **targeted outreach and education strategies** in support of CSA.



Recommendations and Key Messages

- Prioritize and invest in academic, unbiased scientific research. Rigorous research is needed across multiple agricultural systems. Fine-scale data needed on future climate conditions and how ag systems will respond.
- BMP practices must continue to be expanded and adapted to suit future climate conditions. **Evaluate and update ag BMPs to strengthen capacity for adaptation.**
- **Strengthen monitoring** to inform data collection and address gaps.
- **Evaluate, update and fund conservation programs** that support agriculture.
- **Evaluate supply chain and infrastructure adaptations** needed to sustainably increase and diversify production.
- **Conserve agricultural land** for agricultural uses. Include ag leaders or representatives in state policy discussions to ensure continued integration into statewide planning.
- **Strengthen farmer insurance** to protect against future climatic conditions. Ensure adequate coverage for all crop types.
- Along with the challenges, climate change can present **new opportunities** and the state must search and **prepare** for them.



Who will do this work?



This report lists numerous state agencies and public institutions throughout the main report and in the 13 accompanying recommendations. Key players include:

- Farmers and producer representative organizations
- State agencies
- The Maryland Commission on Climate Change
- The Maryland General Assembly and policymakers at the state level
- The Governor's Office
- The University of Maryland, the University of Maryland Eastern Shore, UMD Extension and private academic institutions
- Agricultural trade groups and nonprofit partners

Project Outcomes

● Data

Projected impacts of climate change on Maryland farms and farmers

● Tools

Access to science-based knowledge of tools and ideas for agricultural adaptation

● Facilitation

Discussions about how the state can help farmers in a changing climate

● Recommendations

13 policy and research recommendations to support climate-smart agriculture in Maryland

We want to create an ongoing partnership to ensure that Maryland farms remain in business as the climate continues to change, bringing together:

- Farmers and Farm Organizations
- Researchers
- Service Providers
- Policymakers
- State and Local Government Representatives
- Nonprofit and academic institutions

Targeted completion: Fall 2025

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