Advancing Market-Based Approaches in the Agricultural Sector to Support Chesapeake Bay Watershed Restoration

STAC Workshop Report
July 8-9, 2025
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About the Scientific and Technical Advisory Committee

The Scientific and Technical Advisory Committee (STAC) provides scientific and technical guidance to the Chesapeake Bay Program (CBP) on measures to restore and protect the Chesapeake Bay. Since its creation in December 1984, STAC has worked to enhance scientific communication and outreach throughout the Chesapeake Bay Watershed and beyond. STAC provides scientific and technical advice in various ways, including (1) technical reports and papers, (2) discussion groups, (3) assistance in organizing merit reviews of CBP programs and projects, (4) technical workshops, and (5) interaction between STAC members and the CBP. Through professional and academic contacts and organizational networks of its members, STAC ensures close cooperation among and between the various research institutions and management agencies represented in the Watershed. For additional information about STAC, please visit the STAC website at http://www.chesapeake.org/stac.

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Executive Summary

The **July 2025 STAC Workshop, Advancing Market-Based Approaches in the Agricultural Sector to Support Chesapeake Bay Watershed Restoration,** brought together experts from academia, government agencies, industry, and nonprofits to discuss the pressing need to advance agricultural conservation goals through market mechanisms, public-private partnerships, and related approaches. Water quality goals for the Chesapeake Bay remain unmet, with the agricultural sector responsible for the majority of remaining load reductions. Despite substantial past efforts to promote agricultural conservation practices, progress has been slow, suggesting a need for new approaches that will scale across agricultural producers.

Market-based mechanisms hold genuine potential to increase cost-effectiveness of public spending by paying for verified performance and driving innovation, but realizing that potential will require adaptive management, sustained public and private funding, and strategic alignment across approaches. The workshop underscored that market mechanisms remain in early stages of development and testing, with private capital and in-kind support playing a relatively small role compared to public funds. Further, these programs have not yet realized their full potential to scale programs through market signals.

In this report, we share findings and recommendations gleaned through interactive panels and discussions in which participants examined incentives for water quality restoration using two distinct but complementary approaches: **Pay-for-Performance (PfP) programs** that tie payments to measured or modeled outcomes, and **Supply Chain Initiatives (SCIs)** that leverage corporate sustainability commitments and consumer demand for environmentally-friendly products. These approaches appear to have strong potential and appear to have accelerated project delivery and produced cost savings in some cases. This workshop examined constraints to and pathways for increasing their success. Materials and presentations are available on the workshop webpage.

Key findings from the workshop include:

1. **Program design involves trade-offs between accuracy, cost, and innovation:** Conducting measurement, monitoring, reporting, and verification (MMRV) using *direct* outcome measurements, rather than modeled outcomes, would increase confidence in project performance and incentivize innovation in technology and performance-based MMRV tools. However, using direct outcome measures involves higher MMRV costs and shifts performance risks to project implementers, which may impact participation. Support for using measured versus modeled outcomes varied among participants, but they agreed that simplicity and manageable costs are key to program growth, and that performance MMRV can be improved.
2. **Competing goals shape program design, participation, and outcomes:** Participants noted a tension between Chesapeake Bay water quality objectives and broader conservation goals. Current PfP programs have a core goal to produce cost-effective nutrient reductions, although some programs include co-benefits in project selection. Opinions differed on how much weight should be given to co-benefit goals since it was perceived by some that adding co-benefits to project selections could reduce the program's cost-effectiveness for nutrient reductions. In SCI programs, corporate sustainability goals invert Bay priorities with carbon sequestration, biodiversity, and animal welfare often being central goals, and nutrient reductions being treated as secondary co-benefits. Across all programs, trade-offs can arise between conservation goals and agricultural productivity or profitability.

3. **Financial constraints limit scalability and impact:** PfP and SCI approaches face challenges in generating and sustaining sufficient funding, and both currently rely heavily on government funding. PfP programs are currently allocated a small percentage of the total public funding for Bay restoration. Farmers engaged in SCIs often use public money to fund management practices, and they noted cases of financial "squeeze" from mid-supply chain actors who demand sustainability without equitable financial contributions. Participants discussed other funding models but were generally skeptical that either program would generate new Bay-specific private funding or substantial in-kind support under current market conditions.
4. **Transaction costs and administrative burdens are major barriers to participation:** Across all approaches, participation is limited by "transactional friction" such as burdensome paperwork, slow permitting and reimbursement processes, rigid program rules, and payments that do not fully cover costs. These barriers affect PfP programs and SCI efforts and reduce the overall efficiency and accessibility of conservation programs, although PfP and SCI approaches and technology-based MMRV are intended to reduce some administrative burdens.
5. **Trust is foundational and key to scaling programs for Bay restoration:** Across both approaches, trust was identified as the essential, foundational element for success. Producers must trust their technical advisors, program implementers, and their supply chain partners to be willing to participate in market-based programs. Participants noted that trust, which is built through sustained and personal interactions, has been difficult to scale to the degree necessary for accelerating watershed restoration. Market-based approaches can use innovative incentives and implementation models that leverage trusted networks to expand program participation.

Recommendations were identified to strengthen market-based agricultural conservation efforts, with a focus on improving program effectiveness, reducing barriers to participation, and enhancing public-private collaboration. A broader list of recommendations (Section 4) covers market-based and traditional cost-share programs, which play a role in enabling market-based approaches. Key recommendations from the workshop include:

1. **Develop lower-cost MMRV options:** Reduce transaction costs by advancing more efficient and scalable MMRV approaches, including the use of locally-validated models, remote sensing, and innovative data sources, while maintaining credibility and rigor.
2. **Adaptively manage existing PfP programs:** Carefully evaluate and learn from the existing PfP state programs, which have different rules, to compare effectiveness and to identify and advance the social and ecological science needed to optimize these programs.
3. **Take risks to drive innovation:** Different types of program experiments, and a safe regulatory space for conducting experiments ("sandboxing"), have the potential to generate new and effective approaches. A specific suggestion was to allow agribusiness entities to manage some portion of cost-share funds to leverage their existing relationships with farmers and technical knowledge. Other suggestions centered around streamlining application and reporting portals and generally reducing the time and effort required to comply with program rules.
4. **Work towards aligning public and private sector goals:** Repeated engagement among partners is critical for goal alignment and can be facilitated through forums, partnerships, and supply chain engagement. Demonstrating and quantifying broad benefits of agricultural practices, such as greenhouse gas reductions and biodiversity, can help identify projects that align stakeholder incentives and attract private-sector interest and investment.

1. Introduction

Chesapeake Bay restoration relies heavily on publicly-funded, voluntary conservation programs to reduce agricultural nutrient loads. Despite sustained investment and effort, progress toward Total Maximum Daily Load (TMDL) goals has slowed considerably since the TMDL was established (Easton et al. 2025). Meeting the nitrogen (N) TMDL goals will require an estimated 46 million additional pounds of reduction from nonpoint sources, the majority from agriculture, a scale that current program trajectories are unlikely to achieve (Scientific and Technical Advisory Committee 2023). This shortfall reflects not only the limits of existing practice adoption rates, but a deeper mass balance challenge. The watershed continues to import nutrients through feed and fertilizer inputs at rates that conventional best management practices were not designed to offset (Easton et al. 2025; CAST 2025). Monitoring data, particularly for phosphorus (P), suggest that the gap between modeled and observed outcomes may be larger than currently recognized (Webber et al. 2022; Zhang et al. 2025). These trends point to the need for new approaches that can motivate broader participation, improve cost-effectiveness, and better align incentives with measurable pollutant reduction outcomes. Market-based approaches, including Pay-for-Performance (PfP) programs and corporate supply chain initiatives (SCIs), represent a promising set of tools for accelerating progress toward restoration goals. Market-based approaches have the potential to spur innovation in meeting shared goals, but these programs have not been effectively scaled in the Chesapeake Bay restoration context. The purpose of this workshop was to identify key knowledge gaps and provide actionable guidance on the use of market-based approaches to support Chesapeake Bay restoration, with particular attention to the agricultural sector.

The Chesapeake Bay Program (CBP) Scientific and Technical Advisory Committee (STAC) workshop, *Advancing Market-Based Approaches in the Agricultural Sector to Support Chesapeake Bay Watershed Restoration*, was held on July 8–9, 2025, at the Historic Inns of Annapolis in Annapolis, Maryland. The workshop brought together academic researchers, government representatives, nonprofit leaders, and private-sector partners to identify pathways for scaling agricultural conservation through market mechanisms. Participants, who included economists, sustainability directors, conservation program managers, and policy experts from universities, agricultural cooperatives, food companies, environmental organizations, and state and federal agencies, examined where market-based strategies could complement existing tools, with attention to practical design questions and near-term opportunities. The two-day event featured presentations, panel discussions, and roundtable discussions, followed by a post-workshop survey to assess the importance participants placed on emerging recommendations. The workshop structure is described in Appendix A, and the full agenda and speaker list are presented in Appendix B. A participant list is provided in Appendix C. Panel questions can be found in Appendix D.

Across the two days, participants examined the incentives, business drivers, policy frameworks, and implementation constraints that shape decisions across the food supply chain and among public- and private-sector partners. Day 1 focused on the following questions: *What is needed to achieve Chesapeake Bay Program goals? Who needs to participate and how? What incentives shape those decisions? What drivers and frameworks are guiding decision-making?* Day 2 discussed the

following questions: *What are the opportunities and challenges for implementing effective and scalable market-based solutions in the Chesapeake Bay watershed? What do we still not know? What are some research and policy needs and recommendations for the Chesapeake Bay Program?*

The workshop focused on two main categories of market-based approaches, and this report is primarily framed around those two categories. The first category consists of pay-for-performance (PfP) programs that tie payment to modeled or measured outcomes, including definitions of performance, the roles of measured and modeled outcomes, financing needs, and interactions with traditional payment schemes. The second category relates to supply chain initiatives (SCIs) that shape producer behavior through purchaser requirements, certification, and labeling, often supported by processor- or buyer-led technical assistance that can reach producers hesitant to adopt new practices. Discussion of trading programs was limited to avoid diverting attention from these mechanisms.

This report complements ongoing partnership efforts. The CBP Budget and Finance Workgroup (BFWG) developed a workplan highlighting innovative environmental finance that considers recommendations related to PfP systems and identifies what private equity firms need, in terms of regulatory certainty, to commit capital to the region (EFAB 2018). Similarly, the 2023 STAC workshop on ecosystem services produced a report that included recommendations related to institutional structures to create incentives for ecosystem services, standardization of ecosystem services to improve accounting and market potential, and alignment with efforts to adaptively manage and plan for the future of the Chesapeake Bay Program Beyond 2025 (Hanson et al. 2024). These related efforts helped shape the workshop's focus on what is, and is not, working in efforts to use market-based approaches within restoration programs.

Recommendations presented in this report were developed through workshop discussion, roundtable conversations, breakout sessions, participant report-outs, follow-up survey input, and subsequent synthesis by the steering committee. They do not represent consensus positions of all workshop participants, the steering committee, or the Chesapeake Bay Program, but rather reflect a set of ideas and options generated through the workshop process for further consideration. Findings are intended to guide pilot design, targeted research, and communication efforts rather than prescribe policy or evaluate specific programs.

2. Understanding Market-based Approaches

2.1. Defining Market-based Approaches

A primary challenge that emerged early in the workshop, and was reinforced throughout the proceedings, was the lack of a shared understanding or definition of the term "market-based approaches." The workshop steering committee narrowed the workshop focus to market-based approaches that had significant opportunity and momentum to meaningfully advance Bay goals by excluding detailed discussion of water quality trading and carbon markets. Workshop participants, often from different professional backgrounds, used the term “market-based” to describe two fundamentally different strategies: (1) PfP programs that tie payments to measured or modeled outcomes, and (2) SCIs that leverage corporate sustainability commitments and consumer demand for environmentally friendly products. Although they share some opportunities and constraints, the two strategies have different goals, financing mechanisms, implementing partners, and specific barriers. Policy and programmatic recommendations will differ between these two approaches.

It should also be noted that the two conceptual approaches—PfP and SCIs—operate within an already complex and fragmented landscape of existing conservation programs. This landscape includes federal and state cost-share programs, which include longstanding, foundational programs like the U.S. Department of Agriculture (USDA) Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CSP), and Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP). These traditional cost-share programs remain the primary source of conservation funding for most producers. Other existing conservation programs include state nutrient trading programs in Maryland (MD), Pennsylvania (PA), and Virginia (VA), and emerging private markets for carbon, water quality, and biodiversity that are being developed by third-party entities, creating new potential revenue streams, but also significant confusion for producers and those developing wetland and stream mitigation banks.

2.2. Approach 1: Pay-for-Performance (PfP)

The PfP approach focuses on creating a market to achieve a target environmental outcome, e.g., N or P reductions entering waterbodies in the CBW. The core concept is that PfP programs pay for the project implementation based on a competitive selection process to meet cost-effectiveness and other scoring criteria. In contrast, traditional cost-share programs have eligibility requirements but do not consistently rank or reject projects with low cost-effectiveness (e.g., cost per pound N). Another important feature in PfP programs is whether the environmental outcome in the scoring process is calculated using a model approach, such as the Chesapeake Assessment Scenario Tool (CAST), or measured using site-specific information to more precisely estimate outcomes since only the latter can promote innovation.

Three states in the Bay watershed currently have water quality programs that enable PfP using distinct program names. They are (1) Virginia Department of Environmental Quality (DEQ) Pay-For-Outcomes Nonpoint Source (NPS) Pilot Program ($20 million in 2025), (2) Maryland Department of Natural Resources (DNR) Chesapeake and Atlantic Coastal Bays Trust Fund Outcome 1 PfP Track, (3) Maryland Department of the Environment (MDE) Clean Water Commerce Pay for Success

Program ($47 million in 2025), and (4) Pennsylvania's PennVest Clean Water Procurement Program ($6 million in 2024). Several counties also have programs focused on stormwater, and the Susquehanna River Basin Commission (SRBC) uses PfP to meet the Conowingo Watershed Implementation Plan (WIP). See Huntley and Edinger (2025) for a recent report that reviews these PfP programs and offers recommendations to lower costs and increase program efficiency.

All of these PfP programs use cost-effectiveness ($/lb N or P reduction) as the primary performance factor used to rank and select funded projects and consider additional factors in the scoring criteria, such as wildlife habitat improvements and greenhouse gas benefits, to different degrees. All active PfP programs in the watershed are calculating nutrient reductions based on modeled outcomes (CAST in MD and VA, Chesapeake Bay Nutrient Tracking Tool in PA), while the VA pilot PfP program has also allowed measured performance for a couple innovative projects. To date, only the VA DEQ program has funded a project that uses monitoring data to measure performance. This program requires applicants to monitor performance if they propose practices that have not gone through the CBP's BMP approval process, which includes an expert panel review. The panel includes academic experts, tasked to examine the data collected and certify the scientific methods used to assess performance.

Within the PfP approach, workshop discussions revealed two distinctions in strategy relative to traditional cost-share programs:

1. **PfP as a mechanism to target cost-effective practices:** PfP applicants submit bids to implement projects at their proposed cost, within a reverse auction system. Program administrators rank and select projects based on scoring criteria, including cost-effectiveness based on the proposed cost and the measured or modeled estimate of performance (e.g., modeled N reductions using CAST). The PfP structure is a notable step toward improving cost-effectiveness.
2. **PfP as an incentive for innovation:** While modeled performance is simpler to administer, participants noted that CAST model estimates have substantial uncertainty. Site-specific measurement of estimated outcomes is expected to be more accurate, albeit at higher costs to the applicant and program administrators (technical review panels). Importantly, the site-specific measured approach is seen as a mechanism that invites and motivates innovation, particularly for novel projects not approved within CAST. It allows producers and solution providers to use any method they choose—including new technologies or practices—to achieve the environmental goal. It further invites research into approaches to combine field measurements with modeling to lower verification costs. This approach also creates incentives for innovative methods to quantify and verify outcomes, which would provide the public with assurances that the promised outcomes will actually be realized.

The PfP approach is often, though not exclusively, funded by public entities (e.g., state or federal grants). Yet, PfP programs can leverage private entities to provide upfront capital for projects and to shift performance risk to the private sector (Figure 1). Potential private entities include environmental restoration businesses, financial institutions seeking green investments, and corporations with sustainability commitments. The intent is that private firms will invest capital and

provide efficient project oversight, while public entities would only pay after implementation milestones are achieved and modeled or measured outcomes are documented. This delayed payment structure creates higher compliance incentives for the private firm to install a well-designed project since payment is contingent on implementation and performance over the project lifespan. At the same time, participants noted that private firms have higher borrowing costs and tend to be more risk averse, relative to public entities, which in turn can lead to higher proposed costs in the PfP program to finance risky, upfront investments.

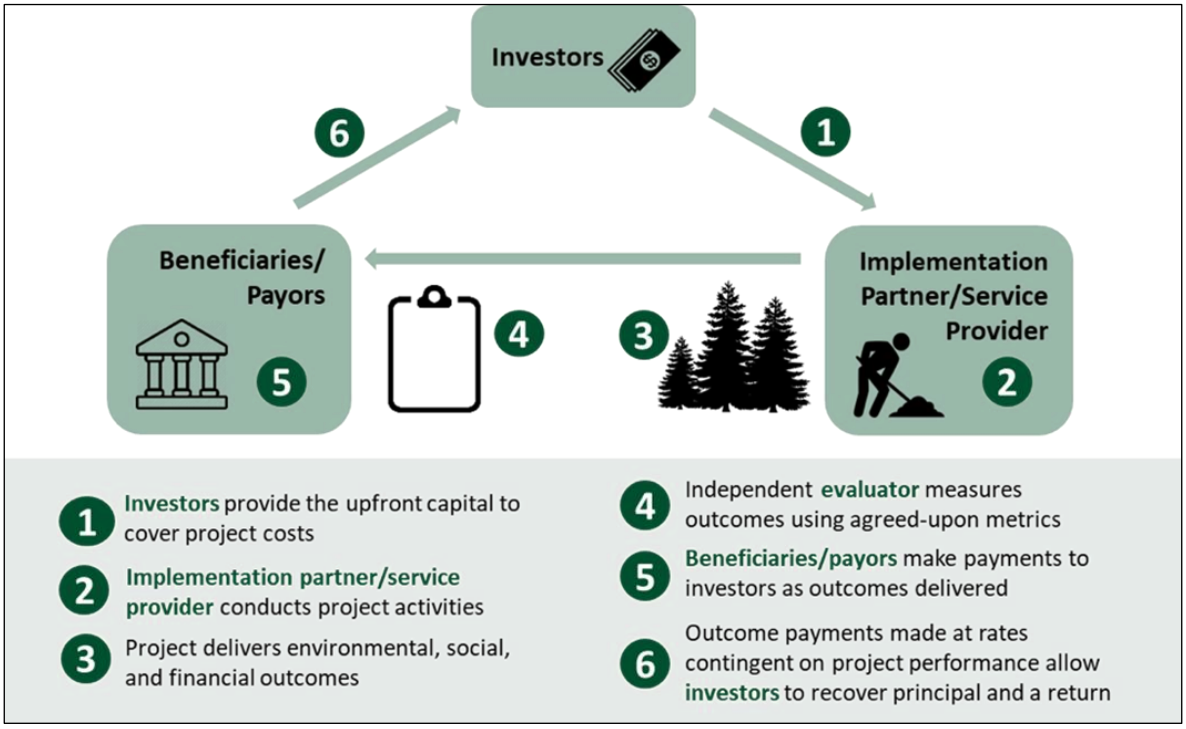

Figure 1. Overview of a pay-for-performance financing model, where private capital covers upfront project costs, implementation partners carry out the work, and investors are repaid only after outcomes are independently verified and paid for by beneficiaries/payors, such as state governments. Figure adapted by Flanagan and Woolworth (2019) with permission from the US Forest Service and distributed under a Creative Commons License.

2.3. Approach 2: Corporate Supply Chain Initiatives (SCIs)

The second approach, driven by private-sector actors from agribusinesses, food brands, and retailers, defines "market-based" as the restoration incentives coming from supply chain purchasers. This approach is motivated by internal corporate sustainability goals (CSGs), consumer demand, investor pressure (environmental, social, and governance (ESG) factors), and the urgent need to report on Scope 3 (supply chain) greenhouse gas emissions. For these actors, nutrient reduction is rarely the sole or even primary objective. Instead, it is one component of a holistic, "stacked" set of environmental goals that may also include carbon sequestration, regenerative agriculture, biodiversity, animal welfare, and water quantity. Workshop participants noted that corporations often have the highest priority for climate and biodiversity goals. As a result, alignment with Bay water quality goals may occur as a co-benefit rather than a primary driver. CSGs were viewed as a more

consistent driver of conservation practice implementation than consumer willingness to pay a price premium for “sustainable” products. Ultimately, SCIs rely on a durable source of revenue that may come from government or corporate sources or be driven by consumer or institutional buyer behavior.

SCIs are not "markets" in the sense of involving open exchanges, but rather bilateral or "in-setting" programs, run within a specific company’s supply chain. The "market" signal is the corporation's demand for sustainable products and the incentives it provides to its producers to meet that demand. Many of the examples presented relied on public funding to partially support the projects and business participants expressed a desire to have greater access to public funding for such initiatives.

Workshop discussions raised multiple elements of SCIs that influence producer behavior and outcomes in the Bay watershed that are organized in this report by where they act along the supply chain (Figure 2). Various components create incentives or drive actions along the supply chain that links inputs and producers to processors, retailers, and consumers. In the diagram, sustainability labeling and market signals (green lines) link to producer certification and verification (purple lines), with a feedback loop between performance criteria and claims. Processor- or buyer-led technical assistance (blue lines) supports management practice adoption at the producer level, while program and blended finance (red lines) provide funding that underwrites implementation.

1. **Labeling and market signals:** These signals are intended to influence producer practices through buyer preferences. Labeling systems are funded primarily through private marketing budgets but may have limited public support. Products are differentiated in terms of biodiversity and climate benefits, and water quality is typically a sustainability co-benefit. Limitations include a weak demand among businesses for Bay-specific marketing and modest buyer interest in paying a premium price for sustainability, which is needed to incentivize and/or fund the sustainability practices. Further, label proliferation can confuse or dilute messaging and buyer interest is sustained only in credible programs.
2. **Producer certification:** The goal of these programs is to incentivize producers to adopt practices that meet certification requirements. They are usually funded through program fees and the public sector, and they target practice or performance standards linked to water quality and co-benefits. These programs can enable labeling and procurement alignment across the supply chain, but can also be expensive and complex. Corporations may be interested in certifications to serve investor expectations or build brand equity, even if investments are not recouped through consumers paying a price premium.
3. **Technical assistance and support:** These programs seek first-time adoption through advice, coordination, and modest cost-sharing, and are often funded through public grants and corporate staff time. They target water quality co-benefits, with climate and soil health commonly bundled. These programs can reach hesitant adopters via existing relationships, but funding can be uneven and the fact that they are trust-based makes them difficult to scale.
4. **Blended private-public financing:** While consumers express interest in sustainable products, their willingness to pay premiums for these products is limited; therefore, companies rely on financing options that blend private and public investments. Corporations

typically focus their investments within their own supply chains so they can create a return on their investment by creating products with the sustainability attributes sought by their consumers. Public financing is still essential to leverage private sector investment. For example, public funds allocated through federal and state cost-share programs can provide producers with the capital needed for costly operation upgrades and adoption of conservation practices.

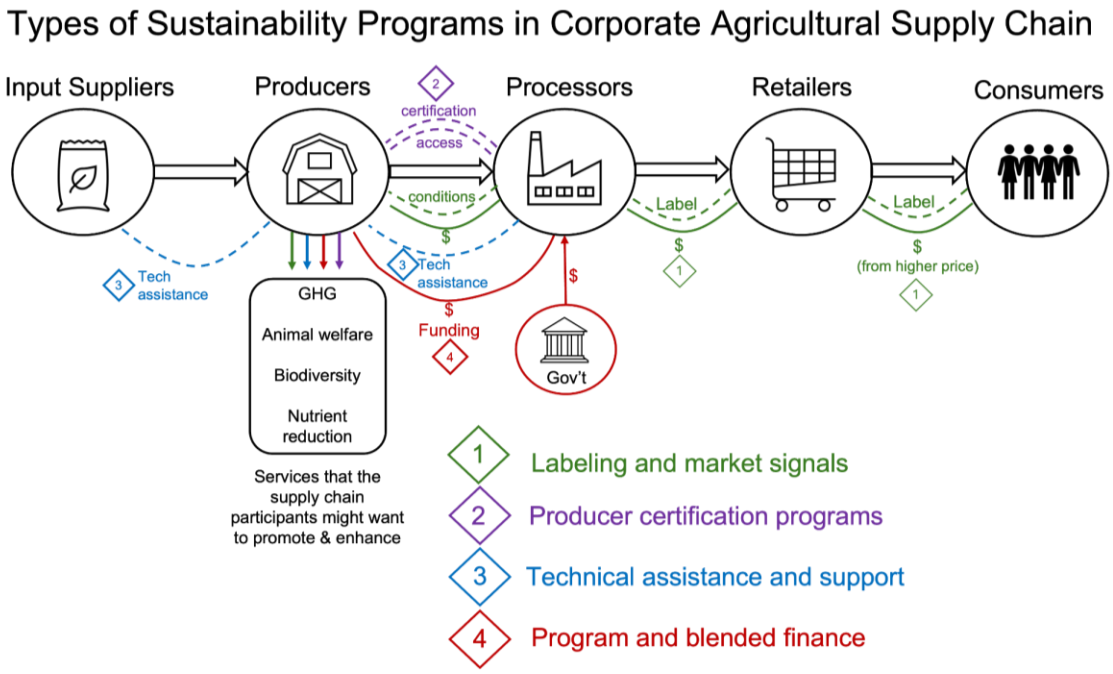

Figure 2. Overview of sustainability initiatives within the agricultural supply chain with a focus on four components that create incentives or drive actions among input suppliers, producers, processors, retailers, and consumers.

2.4 Examples of Market-based Approaches in Action

Example 1: Turkey Hill Dairy Clean Water Partnership Case Study: Mid-chain Leverage, Alignment with Bay Restoration Goals, and Implementation Challenges

An early workshop panel discussion explored how corporate sustainability programs might align with Bay restoration goals. This session highlighted the partnership between Turkey Hill Dairy, Maola Local Dairies (owned by the farmers of Maryland & Virginia Milk Producers Cooperative Association), and the Alliance for the Chesapeake Bay (the Alliance) as a case study to explore how buyer priorities and processor coordination can translate into on-farm changes. Turkey Hill used its position as a major milk buyer to drive conservation by requiring all supplying farms to obtain and implement conservation plans as a condition of maintaining their contracts, seeking to make environmental stewardship a standard part of doing business. The company reinforced this

expectation by offering a price premium to farmers who met the conservation requirements, creating a clear financial incentive for adoption. Notably, Turkey Hill's goal was not to work with farms already in compliance, but to bring suppliers that were not yet meeting standards into compliance. The three partners entered the collaboration with distinct objectives–Maola prioritized reliable supply for its customers, Turkey Hill sought to meet its corporate sustainability commitments, and the Alliance was focused on water quality outcomes. Yet they found that conservation practices such as riparian buffers and farm conservation plans could serve all three goals simultaneously.

The partnership enabled Turkey Hill to help farmers navigate planning and implementation and reduce the administrative burden that often deters participation. The partnership relied on a deliberate division of roles: Maola's advisors, already known and trusted, led farmer-facing outreach, while the Alliance managed grants, metrics, and verification. This structure was particularly effective at reaching hesitant producers; farmers who had never engaged with an environmental nonprofit or considered obtaining funding from the USDA Natural Resources Conservation Service (NRCS) opened up to it when introduced by their own cooperative.

Participation also had a cascading effect. Once one farm adopted practices, neighboring farms began asking questions, building momentum across the community. Corporate investment accelerated participation by tying conservation support to existing supply chain relationships, making farmers more receptive to incentives and requests from trusted buyers and cooperatives already purchasing their products. By embedding conservation expectations across its entire supply chain and backing them with both support and market signals, Turkey Hill demonstrated how a corporate buyer could meaningfully influence on-farm practices and contribute to regional water-quality goals. Reputational risk also played a role since the prospect of an advocacy campaign publicly linking a buyer to non-compliant farms was cited as a motivation for supply chain actors to take environmental standards seriously.

A farmer's perspective: J-Team Dairy, Orange County, Virginia
Molly McWilliams, a dairy farmer who ships milk with Maola, described how her conservation journey began not with a grant application or a government program, but with a farm audit from Maola's sustainability team, who pointed out opportunities she didn't know existed. "The dairy industry isn't overflowing with money," she said, "so when there's additional money we can put towards projects, it's a huge help." Within three years, her farm had established a riparian buffer with a 95% survival rate, with Alliance staff checking in twice a year, and was about to break ground on a pack barn. Her experience illustrates how the cooperative-to-farmer pathway can make conservation feel accessible rather than burdensome.

Discussions also highlighted implementation challenges, particularly the obstacles created by public policy. Participants said that managing grants, data, and funding was particularly challenging. They noted that some funding was only available to non-governmental and non-profit organizations, whereas corporate representatives felt that they could manage the funding cost-effectively, if they were allowed. They also preferred performance metrics that were verifiable (e.g., tree density) over modeled results, and they thought the process of confirming outcomes could be made more efficient

and effective. Panelists also noted that carbon markets currently do not support the cost of agricultural conservation projects, making continued public funding essential to sustain and scale these partnerships.

Example 2: Learning More About How to Engage the Food Supply Chain: Perdue AgriRecycle , Dairy Farmers of America, and Land O'Lakes

Another panel discussion explored how other major food corporations are partnering with Bay organizations to achieve both business and water quality goals and how aligned objectives can accelerate conservation practice adoption across the watershed. Representatives from Perdue AgriRecycle, the Dairy Farmers of America (DFA), and Land O'Lakes described how they are pursuing corporate sustainability in the Bay watershed, with particular attention to what enables farmer participation and what limits scale.

The Sustainable Dairy PA initiative, launched in 2021 through a partnership between Land O'Lakes, The Hershey Company, and the Alliance for the Chesapeake Bay, illustrates how blended public and private funding can distribute the financial burden of on-farm conservation across the supply chain, rather than placing it on farmers alone. In 2023, EPA and Hershey committed $1 million each to support conservation practice adoption on Land O'Lakes member dairy farms in Pennsylvania, administered through the National Fish and Wildlife Foundation. The model is an example of how a corporate customer, a cooperative, a nonprofit intermediary, and a federal agency can align around shared water quality and climate goals. In 2023, the Alliance reported that the project had grown to leverage $16 million in public and private funds to support 150 farmers in the region (U.S. EPA 2023).

DFA, a national dairy marketing co-op, has a sustainability team that develops and implements producer- and grant-funded projects that are designed to meet multiple goals. In partnership with organizations like the Alliance, DFA expanded its activities from a pilot project involving six farmers to having additional funding and expertise that supports more farmers and works with other areas of the supply chain. One DFA project achieved greenhouse gas reductions, water quality improvements, and biodiversity goals simultaneously, demonstrating that multiple corporate objectives can be met through a single well-structured partnership.

Despite these examples of success, the panel discussion identified a number of challenges, echoed in other discussions. The overall reliance on existing relationships and localized efforts was seen as a barrier to scaling programs enough to close significant nutrient reduction gaps. Trust is critical for sustainability initiatives in agriculture. Successful engagement relies on relationships that flow up and down the supply chain and include external partners. These relationships often leverage local experts or regional liaisons to provide face-to-face interactions that help push farms "over the decision line." If any partner in the value chain stands to gain more than others, it creates friction that slows adoption, making it essential that farmers, processors, and buyers all see a clear return before

programs can scale. One panelist noted that consumers are generally not willing to pay a price premium for sustainably produced products, but that corporate sustainability investment continues because downstream customers and investors expect it, and because it supports long-term brand reputation.

Across all three organizations, MMRV emerged as a central challenge, and panelists agreed that the public sector is best positioned to help standardize definitions and metrics across programs, while the private sector develops the verification infrastructure. The supply chain's focus on additional reductions can exclude the early adopters that DFA works with from participating in SCIs, generating questions about program eligibility. DFA also noted that evolving greenhouse gas accounting rules and supply chain traceability requirements can further restrict which farms are eligible, limiting reach. Similarly, Land O'Lakes stated the metrics and verification for carbon outcomes in dairy are "extremely new and extremely cumbersome" and complicated further by the movement of products to multiple customers and regions, creating ambiguity about who owns emission reduction credits. Land O'Lakes uses the Ruminant Farm Systems (RuFaS) model to calculate carbon footprints, and the organization is discussing integrating CAST data to understand nutrient reductions.

More generally, panelists shared that corporations may be unwilling to take on the risk of new program structures alone. Panelists suggested that the public sector needs to step in and absorb early-stage risk before private dollars can be leveraged at scale. Ideas for scaling the program centered around providing increased financial support through credit stacking or combining different types of credits (carbon, nutrients) for the same acre or engaging financial institutions to provide low-interest loans or reduced insurance rates as incentives for sustainable farm management.

Bringing financial institutions to the table to offer reduced-interest loans for conservation projects was identified as an underexplored mechanism for scaling participation.

An environmental consultant's perspective: Weaver Environmental Consulting, Lancaster County, Pennsylvania

Jeremy Weaver is the owner and president of Weaver Environmental Consulting, which partners with nonprofit organizations and government agencies on outreach to small dairy operations. The firm has a staff of five, but is looking to scale up to meet the needs of producers who want to participate in conservation programs, including NRCS and conservation districts programs.

Regarding opportunities to scale, Jeremy referred to the need for faster permitting, reporting, and payments. "There's just so, so much paperwork, and a lot of it is redundant. For some of the programs, the applications and the processes are very similar to one another. Is there a way that we can mainstream some of the process?" Jeremy also pointed to the need for improved water quality monitoring and sampling, both pre- and post-project. "If we can keep up to date with that current information about how these BMP projects that we're implementing are reducing nutrient sediments, we can use that data to promote conservation and continue to see how conservation pays."

Example 3: Generating New Sources of Funding: The Conservation Innovation Fund

During a panel discussion on PfP programs, an example emerged as an innovative approach for blending public and private financing. The Conservation Innovation Fund (CIF) operates by viewing market-based conservation through the lens of the finance sector, seeking to create "units of conservation" and generate demand from public and corporate entities willing to purchase these assets. This approach was described as investing capital to develop a conservation product (a verified unit of N, P, or carbon reduction) and selling that product to a buyer, typically a government agency. Under this model, PfP contracts function like "software venture capital"– money goes in to develop the product, and revenue comes back when the government purchases the verified outcome.

CIF operates as the nonprofit arm of a private investment fund (I2 Capital). This structure was chosen deliberately. When CIF entered the agricultural conservation market, it found that private equity returns cannot be justified under current market conditions, so it instead works with development capital. A major challenge is that market values for environmental outcomes, such as carbon (cited at $10 - $50 per ton of carbon dioxide equivalent, CO2e), currently do not cover the costs of implementing solutions, necessitating CIF to "blend" capital, incorporating government grants, philanthropic funding, and return-oriented capital to subsidize projects. CIF produces the "conservation asset" by translating implemented Best Management Practices (BMPs) into quantifiable units of value using MMRV systems, specifically mentioning RuFaS for the dairy sector and CAST for water quality, while noting that robust MMRV systems are currently limited. Furthermore, CIF, in collaboration with the Environmental Policy Innovation Center (EPIC), is summarizing the weighting systems used in PfP programs, which generally prioritize the lowest cost per pound of N but must also account for various other weighted co-benefits. CIF also developed internal pricing data on what it costs to produce a pound of N, P, or carbon across a range of BMPs in the Bay watershed - pricing transparency that CIF views as foundational to making the market function.

Starting with conventional BMPs such as cover crops and nutrient management, market dynamics led CIF toward a perennial commodity crop with exceptionally high N uptake and carbon sequestration capacity and its own independent market value. This crop is now the basis for contracts underway in Virginia, Maryland, and Pennsylvania. This was shared as an example of the kind of innovation that panelists argued can only emerge when applicants are told "where to go, not how to get there."

3. Challenges to Address

Participants and panelists identified specific challenges that need to be addressed to advance market-based approaches at the scale required to achieve Chesapeake Bay water quality goals. Six key challenge areas include:

1. **Hurdles to innovation:** Participants expressed concern that the potential for innovation is limited by current program designs and policy constraints.
    a. Reliance on modeling tools like CAST limits the types of practices that are counted, and the process to add new practices and approaches to those that can receive credit towards the TMDL is very long and intensive. This rigidity stifles the development of novel solutions to reduce nutrient loading.
    b. The design and rules of some current programs create incentives that reward *more* practice adoption rather than the *most effective* practice adoption, which limits innovative targeting approaches that could increase the environmental impacts that can be achieved with limited funds.
    c. Public policies were frequently cited as a barrier. Programs are often "too siloed," (e.g., a state water quality program may have rules that conflict with a USDA carbon program), preventing the holistic, stacked-incentive approach that corporations want to pursue. Furthermore, public policies are often seen as "risk-averse," imposing "impossible conditions" on the use of taxpayer money, which stifles innovation.
2. **Measurement, monitoring, reporting, and verification (MMRV) costs and limitations:** High costs and limitations to MMRV were identified as the greatest barriers to more accurate site-specific outcome-based PfP programs. Accurate, reliable, and trusted MMRV approaches are critical for SCI programs, regardless of whether the program incentivizes practice adoption or environmental outcomes.
    a. The cost, complexity, and scientific uncertainty of measuring "realized outcomes" onsite are often prohibitively high. This includes costs for the applicant, as well as program administrators who need a technical review panel to assess the validity.
    b. In contrast to using approved models (CAST), participants noted a fundamental tension in the site-specific MMRV approach between ensuring high confidence in pollutant-control performance through direct outcome measurements, for some types of practices, and managing the higher costs of collecting those data.
    c. Support for different program designs is shaped by opinions about the accuracy of existing models at predicting outcomes and the limits of field measurements to overcome lag effects and multiple runoff pathways.
3. **Competing conservation objectives (performance criteria & co-benefits):** Across PfP and SCI discussions, participants noted that Chesapeake Bay water quality objectives (e.g., nutrient reductions) and broader sets of conservation goals (e.g., biodiversity, carbon sequestration) were not well-aligned.

    a. Corporate participants indicated that nutrient reduction can be less important to them than some other goals including carbon sequestration, biodiversity, and animal welfare.
    b. Broadening program goals to attract participants with diverse sustainability goals was seen by some as an effective way to scale programs. However, some noted that broadening goals can reduce a program's cost-effectiveness for achieving water quality goals since funds are not necessarily targeted to projects with the highest nutrient reductions per dollar spent.
4. **Limited potential for new sources of funding:** The question of "who pays" (public funds vs. private buyers) remains a central, unresolved issue. Participants did not express support or optimism for the corporate supply chain to generate new Bay-specific funding.
    a. Participants expressed concern that PfP programs are often "underfunded and short-term," relying on temporary grant cycles. This "feast or famine" cycle fails to provide the long-term financial certainty producers need to make significant changes to their operations and to build the awareness of the nascent PfP programs.
    b. Brands in the middle of the supply chain are caught between competing pressures: retailers and consumers demand sustainable products but are unwilling to pay more for them, leaving brands unable to recover the costs of sustainability programs through pricing. Without that revenue, brands lack the resources to adequately compensate their farmer suppliers for implementing the conservation practices being required of them, placing the economic burden on the producer.
5. **Barriers to participation:**
    a. The PfP programs can be seen as shifting the performance risk from the government (which traditionally pays for the *practice*) to the project implementor (who now must guarantee the *outcome*). Without adequate financial compensation, this risk may be undesirable.
    b. The timing of payments is another challenge. Implementers have to invest capital up front for structural projects but get paid back over the project lifespan (10-20 years), with higher borrowing costs than government agencies.
    c. Implementers face enormous "transactional friction" related to paperwork, accounting, and grant management. Enrolling in multiple public and private programs requires repetitive, time-consuming data entry.
    d.
6. **Scaling trust-based models:** Across both approaches, trust was identified as the essential, foundational element for success. Participants noted that the reliance on personal relationships and high-touch technical assistance, while effective, is extremely difficult to scale to the degree necessary for accelerating watershed restoration. Trust must flow in multiple directions. Producers must trust their technical advisors, the programs, and their supply chain partners to be willing to participate in market-based mechanisms and change their operations and/or management.

a. Market-based approaches can offer more flexibility than traditional programs in developing trust among participants since they can rely on existing relationships (SCIs) or hire trusted messengers (PfPs), among other approaches.
b. Corporate SCIs case studies demonstrate success in leveraging existing, trusted relationships to drive practice adoption, but the conditions that enabled these successes may not transfer easily to all supply chains. Corporate structures vary widely, pricing dynamics are unique and complex, and most corporate partners want reductions to count within their own supply chain, restricting geographic reach.

4. Conclusions and Recommendations for Advancing Market-based Approaches

Market-based approaches to incentivizing conservation on agricultural land offer meaningful opportunities but also face practical challenges that could limit their scale and effectiveness, if not addressed. From an opportunity perspective, they have the potential to blend public and private efforts to be more cost-effective. Actors who can increase efficiency are entering some programs, although outcomes remain uncertain. Further, if the time and monetary costs of MMRV can be reduced through research and locally verified modeling, then PfP approaches can drive practice innovation and promote effective performance, but only if regulators are willing to enable some risk-taking.

The barriers are substantial, however. Some project implementers remain wary of true performance-based payments because outcomes depend on weather and biological variability beyond their control. Many supply-chain initiatives rely primarily on public funds for project implementation, although corporations can play an important role in promoting participation and providing technical assistance. However, corporate interest in water quality goals is often secondary to other sustainability goals. As a result, while market-based tools can complement public conservation programs, their success depends on careful program design, trusted intermediaries, and sustained technical and financial support for producers.

Workshop discussions and follow-up survey responses identified eight key recommendations for advancing market-based programs, representing areas identified as highly important by participants:

1. **Develop lower-cost verification options**
    a. To reduce the high transaction costs associated with PfP programs that currently hinder market participation, simpler but reliable MMRV options are needed. This effort includes exploring the use of evidence-based models, remote sensing, and citizen science, while maintaining the levels of precision required by stakeholders.
2. **Encourage adaptive management**
    a. Clearly define alternative market-based approaches, including defining what "performance" means when discussing PfP programs; i.e., to pay for practices more efficiently or to create new incentives for quantified or measured outcomes.
    b. Once defined, ensure program rules align with goals, for example by setting requirements to increase cost-effectiveness over time.
    c. Implement learning from evaluating existing state PfP programs. Use comparisons of the different rules and goals (cost-effectiveness, certainty of outcomes, new methods created) to identify and advance the social and ecological science and policy changes needed to optimize these programs and articulate design tradeoffs.
    d. Address policy, financial, logistical, and behavioral barriers limiting program participation through appropriate changes including simplifying and streamlining programs, block grants, and state tax credits.
3. **Promote innovation**
    a. Fund trials and “sandboxing” initiatives in high-priority areas of the CBW to enable tests of innovative practices (e.g., VA DEQ pay-for-outcomes) that are otherwise

discouraged by “risk-averse money”; test alternative systems of outcome monitoring and reporting and commit to the adoption of sandboxing initiatives found to be successful.

b. Advance program rules that enable new practices to be used such as Virginia’s approach that credits novel practices that have rigorous performance measures.

4. **Promote alignment of public and private goals**
    a. While many participants stressed that a narrow focus on nutrient and sediment runoff reduction had advantages for PfP performance and administration, others saw an opportunity to expand performance metrics as a way to align diverse interests, particularly when engaging corporations. At a minimum, programs could quantify co-benefits of a nutrient program, such as biodiversity, greenhouse gas (GHG) impacts, and animal welfare outcomes. Some groups are already doing such quantification and could be partners in this process.
    b. Develop a mapping or matrix to compare public- and private-sector objectives and metrics (e.g., Key Performance Indicators). Metrics would reveal ways that programs could adapt to be more attractive to private investment.
    c. Identify missed opportunities to deliver environmental benefits. Farmer representatives expressed a desire to go “beyond” typical BMPs and to find “...inexpensive things [for farmers] to do that have value to the other partner.”
5. **Increase engagement between public and private sectors**
    a. Encourage repeated interactions between the public and private sectors across the entire supply chain, possibly through "pre-competitive" or "collaborative" forums. Consistent engagement is critical for building the long-term relationships and trust necessary for successful market-based solutions.
6. **Streamline market-based programs and traditional conservation programs (which often support market-based solutions)**
    a. Create a common, unified application to coordinate across programs for financing agricultural practices and innovations to substantially reduce the effort required from farmers and project developers.
    b. A centralized platform, acting as a regional clearinghouse for market-based and complementary programs, would increase understanding of funding opportunities and stackable payments, enabling projects that create co-benefits.
    c. Conservation programs, which enable SCI market-based approaches, may benefit from a data sharing platform in which farmers only need to enter farm information once while applying to multiple programs, while also providing buyers with information on project effectiveness. An effective platform would need to address tensions between these two uses of shared data, since farmers would expect confidentiality while verification of project effectiveness would require loosening confidentiality constraints. Such a platform would need to be co-designed by farmers, private corporations, and public agencies to promote acceptance and use.
    d. Identify technology-based tools, such as “data wallets” that secure farm data ownership, automate financial records, and ensure interoperability as a way to streamline programs.

7. **Improve financing and policy support**
    a. Align public programs (e.g., EQIP, state cost-share) to make them interoperable with private-sector sustainability initiatives, enabling partnerships and the stacking of incentives (e.g., for water and carbon) in a way that is clear and transparent, and allows for tracking key program outcomes (e.g., cost-effectiveness).
    b. Explore and pilot new financing mechanisms that move beyond short-term grant cycles that create uncertainty of payback for ambitious multi-year projects. These mechanisms could include blended finance models that use public funds to de-risk private investment (e.g., protect against downside risk, guarantee credit purchases), green bonds (i.e., provide low-interest, multi-year capital), or other long-term funding commitments (e.g., revolving loan funds) that provide the financial certainty producers or private investors need.
    c. Further research and dialogue are needed to ensure that the financial costs of sustainability are shared equitably across the supply chain and are not borne solely by producers.
8. **Encourage research on adoption behavior**
    a. Understand the social, economic, and behavioral triggers that generate levels and types of behavior change.
    b. Determine whether corporate technical assistance and supply chain leverage are able to induce behavior change in producers who are not receptive to public programs.
    c. Focus on adoption behavior under different payment approaches. Consider how program design (e.g., measured vs modeling outcomes, corporate involvement) promotes broad adoption and innovation and mitigates non-additionality and other concerns.

Advancing these recommendations requires collaboration among and between Chesapeake Bay Program partners, state and federal agencies, non-governmental conservation organizations, researchers, producers, and private-sector supply chain actors. Different recommendations may be most relevant to different audiences, and progress will depend on successful coordinated efforts across sectors to test innovative approaches, reduce barriers to participation, and align public/private objectives.

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Appendix A: Workshop Structure and Agenda

Workshop Structure

The workshop was primarily made up of panel discussions that highlighted market-based approaches and other innovations within agricultural conservation (*the full agenda is provided below*). Roundtable discussions engaged participants in reflecting on the panel discussions to distill lessons learned and to brainstorm ideas to increase the effectiveness and scale of policies and programs.

Kurt Stephenson (Virginia Tech) set the stage for the workshop by explaining the rationale for a focus on agricultural sources of nutrients and the opportunities and challenges to achieving nutrient goals. He emphasized that water quality remains a central goal of Chesapeake Bay restoration efforts. However, despite substantial resources and attention, nutrient reduction goals remain unmet, largely because of the difficulty in reducing nonpoint source pollution.

Topical Panels

Day 1 panels examined what is needed to achieve Chesapeake Bay Program goals, who needs to participate and how, what incentives shape those decisions, and what drivers/frameworks are guiding such actions. Three panels explored these issues from various perspectives. The first panel, *Corporate Sustainability Programs: Opportunities to Align with the Chesapeake Bay Restoration*, examined how private-sector sustainability goals may align with watershed restoration priorities, and considered supply chain initiatives (SCIs) partnerships, implementation challenges, achievement of measurable outcomes. The second panel, *Saving our Watersheds through Foodsheds: Engaging the Food Supply Chain to Meet Business and Chesapeake Bay Goals*, reviewed how food companies and Bay-focused organizations are partnered to advance both their business objectives and water quality goals important to the partnership. The final panel, *Pay for Performance (PfP)*, focused on outcome-based financing models aiming to deliver environmental outcomes, with input from applicants on how performance is defined, measured, and verified.

The Day 2 panelists (Appendix C) discussed opportunities and challenges associated with implementing effective and scalable market-based solutions in the Chesapeake Bay watershed. The first panel, *Decision-Making: Private & Public Sector Priorities*, analyzed how agencies, funders, and the companies prioritize sustainability and how public support may alleviate private sector risk. The second panel, *Scalability: Market-Based Incentives for Ag Conservation*, discussed what is required to expand market-based solutions in practice, considering factors such as farmer capacity, supply chain partnerships, investment gaps, and overall, what is needed to support workable implementation pathways. Science and policy gaps were a consistent theme as more research and policy development were seen as mechanisms to enable market-based incentives.

Facilitated Roundtable Discussions

The afternoon of Day 1 shifted to facilitated roundtable discussions designed to pull in distinct participant perspectives by engaging attendees in small table conversations with subject-matter experts.

Roundtable discussions focused on six topic areas: metrics, funding and financing, agricultural practices, outcome-based models, the public sector, and the private sector. Each topic was centered around a set of questions (Appendix C), including the primary opportunities associated with the topic, immediate versus longer-term opportunities, changes needed to make those opportunities realistic and effective, ideas to increase scalability and alignment of incentives, additional incentives that may be needed, the actors best positioned to create those incentives, and the science needed to support progress.

Breakout Session and Plenary Discussion

Breakouts were split into four topical areas: public-private collaboration and engagement; science/metrics/modeling/verification; program development, testing, and evaluation; and financing. Themes identified across the breakout groups were consolidated by the steering committee and shared before the workshop adjourned through a Google Slides presentation (Appendix H). Images of breakout responses are also included in Appendix H.

The remaining portion of the workshop was reserved for a large plenary synthesis discussion on next steps and high-level recommendations. Breakout group discussions helped identify research and policy needs and generate an initial set of potential recommendations, including possible actions for the Chesapeake Bay Program to champion.

Post-Workshop Participant Survey

Immediately following the workshop, participants were requested by email to complete a brief anonymous Qualtrics follow-up survey to elicit the level of importance attendees placed on key recommendations that emerged from breakout groups. Questions also assessed concurrence with report themes. The survey received 34 responses to the background questions, 24 responses to the recommendation-rating question, and 21 responses to the follow-up ranking questions. The Qualtrics survey report is provided in Appendix E.

Recurring themes from the workshop were developed into recommendations that workshop participants were asked to rank in the post-workshop survey. The survey asked participants to rate the importance of recommendations on a four-point scale ranging from not important to extremely important (Figure 3), rank the recommendations they viewed as most important, and provide open-ended feedback for consideration in the report. Open-ended responses showed an interest in continued follow-up, stronger engagement across sectors, and attention to practical implementation barriers, while cautioning that an emphasis on co-benefits should not conceal or take precedence over nutrient reduction and mass-balance challenges.

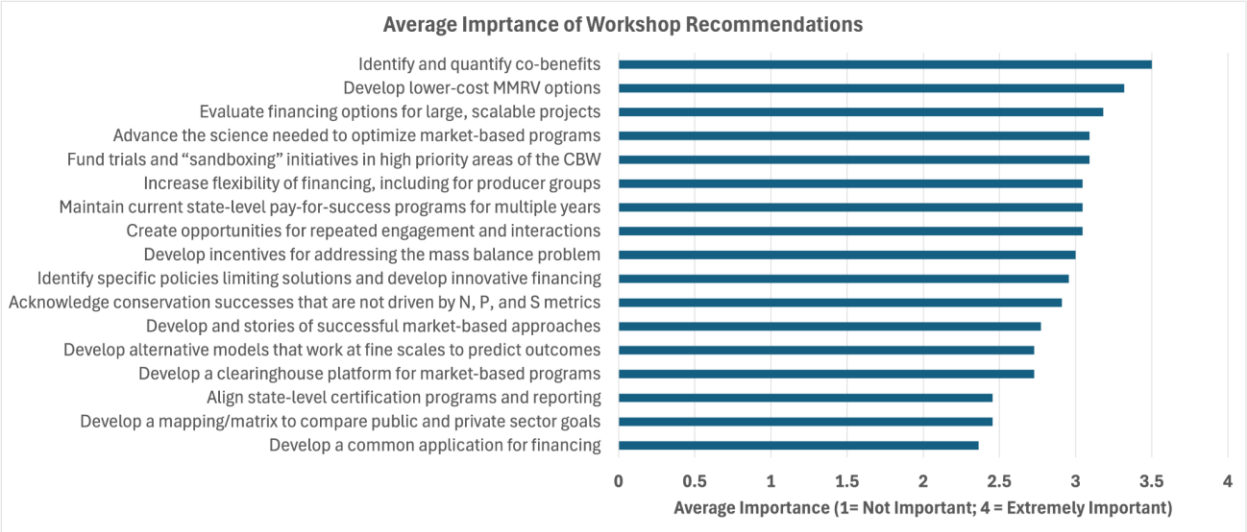


Figure 3. Summary of importance ratings from the post-workshop Qualtrics survey for recommendations generated during the Day 2 breakout group activity (n = 24). Bars show the number of participants rating each recommendation as not important, somewhat important, very important, or extremely important.

Development of Recommendations

Recommendations presented in this report were developed through an iterative workshop and post-workshop synthesis process and the choice of which recommendations to elevate as major recommendations was decided by the steering committee. Initial ideas emerged during panel discussions and Day 1 roundtable conversations, where participants identified barriers, opportunities, financing needs, and areas where additional science or policy support may be needed. These ideas were further developed during the Day 2 breakout session, where participants discussed possible actions, research needs, and implementation considerations in smaller groups. Breakout discussions were followed by participant report-outs and plenary synthesis to identify recurring themes and areas of emphasis across groups. Following the workshop, participants were invited to complete a brief anonymous Qualtrics follow-up survey to help the steering committee better understand the importance participants placed on recommendations generated during the workshop and to inform preparation of the final report.

Workshop recommendations are reported in Chapter 4. Recommendations presented in the report should be understood as products of the workshop and the subsequent synthesis and prioritization process. They do not represent a consensus position among all workshop participants, the steering committee, or the Chesapeake Bay Program partnership.

Appendix B: Workshop Agenda

Chesapeake Bay Program's (CBP)
Scientific and Technical Advisory Committee (STAC)
Workshop

Advancing Market-Based Approaches in the
Agricultural Sector to Support Chesapeake Bay Watershed Restoration
July 8-9, 2025

Workshop webpage

Workshop Objective: This workshop aims to identify key knowledge gaps and provide actionable guidance for implementing market-based approaches to achieve Chesapeake Bay goals. A primary focus will be on working cooperatively with federal and state agencies and the private sector to advance corporate sustainability programs and pay-for-performance programs to accelerate the speed and scale of implementation of agricultural conservation practices. Discussion will examine synergies and frictions among incentives and frameworks governing the decisions of private-sector and public-sector partners across the food supply chain. Participants will collectively work to propose next steps and recommendations to improve the coordination and implementation of these approaches.

- **Day 1 Objective:** What is needed to achieve CBP goals, who needs to participate and how, what are their incentives, what drivers and frameworks are guiding decisions?

- **Day 2 Objective:** What are the opportunities and challenges for implementing effective and scalable market-based solutions in the Chesapeake Bay watershed? What do we still not know (science and policy gaps)? What are some research and policy needs and recommendations for the Chesapeake Bay Program?

Tuesday, July 8, 2025

8:45 am **Coffee & Light Breakfast (Provided)**

9:00 am **Welcome and Introductions** – *Lisa Wainger, Professor of Environmental Economics at UMCES, and Yusuke Kuwayama, Associate Professor in the School of Public Policy at UMBC* Steering Committee Co-Chairs, Lisa Wainger and Yusuke Kuwayama, will kick off the workshop with a welcome and introductions and outline the objectives of the workshop.

9:10 am **Welcome from the City of Annapolis –** *Councilmember Harry Huntley*
Harry Huntley, who represents downtown Annapolis on the City Council and serves as Agriculture Policy Lead at the Environmental Policy Innovation Center, will offer a brief welcome on behalf of the City.

9:15 am **Agriculture's Role in the Chesapeake Bay Restoration: Scaling up Ag conservation**
– Kurt Stephenson, Professor in the Department of Agricultural and Applied Economics at Virginia Tech and CESR Report co-editor
Kurt Stephenson (VT) will outline agriculture's progress toward Chesapeake Bay goals, quantify

remaining challenges, and introduce innovative approaches needed to accelerate conservation through new partnerships and funding models - setting the stage for subsequent workshop discussions.

9:45 am **Panel Discussion: Corporate Sustainability Programs - Opportunities to Align with the Chesapeake Bay Restoration**

This session will explore how corporate sustainability programs align with Bay restoration goals, using Maola Dairies' Sustainable Dairy Program as a case study to examine successful supply chain partnerships, implementation challenges, and measurable outcomes.

Moderator: Mauricio Rosales, Senior Agriculture Projects Manager, Alliance for the Chesapeake Bay

Opening presentation*:* Rod Snyder*,* Principal, Junction Strategies, LLC. and former President of Field to Market and Senior Advisor for Agriculture for the EPA Administrator

Panelists**:**

- Janae Klinger, Director of Animal Care & Sustainability, Maryland & Virginia Milk Producers Cooperative
- John Cox, Chairman of the Board of Turkey Hill Dairy

10:45 am **20-minute Break**

11:05 am **Panel Discussion: Saving our Watersheds through Foodsheds - Engaging the Food Supply Chain to Meet Business and Chesapeake Bay goals**

This session will explore how major food corporations are partnering with Bay organizations to achieve both business and water quality goals, demonstrating how aligned objectives can accelerate conservation practice adoption across the watershed.

Moderator*:* Jenna Mitchell Beckett, Agriculture Program Director, Alliance for the Chesapeake Bay

Panelists:

- Aaron Harris, Sustainability & Animal Care Specialist, Land O'Lakes, Inc.
- Scott Raubenstine, Vice President Agricultural Services, Perdue AgriRecycle - Regenerative Agriculture Program
- Annika Fuller, Sustainability Field Specialist, Dairy Farmers of America

12:20 pm **Lunch (provided)**

1:20 pm **Panel Discussion: Pay for Success**

This session will serve as a comprehensive discussion of Pay for Success: a new method of financing restoration that has already expanded to be worth over $100 million in just the past three years. In a Pay for Success program, government defines water quality outcomes and invites applicants to provide them for the lowest possible cost, completing all planning, design, and implementation work themselves. These programs now exist in Maryland, Pennsylvania, and Virginia – as well as sporadically throughout the rest of the country. While Pay for Success can

improve the targeting of BMPs and offer farmers more flexibility, there are important questions about how success is defined and how to optimally design these programs.

***Moderator**:* Harry Huntley, Agriculture Policy Lead, Environmental Policy Innovation Center

Panelists:

- Kurt Stephenson, Virginia Tech, former STAC member and CESR Report co-author
- Tim Rosen, Director of Agriculture and Restoration, ShoreRivers
- Ashley Allen Jones, Founding Board Chair, Conservation Innovation Fund
- Jason Keppler, Conservation Grants Program Manager, Maryland Department of Agriculture

2:15 pm **20-minute Break**

2:35 pm **Roundtable Discussions : Identifying Challenges, Innovations, and Opportunities**
Subject-matter experts will facilitate focused discussions on challenges and opportunities, with participants free to rotate tables or stay put.

4:00 pm **Roundtable Report Out**

4:30 pm **Wrap-Up Discussion: Key Takeaways from Day 1** – *led by workshop Steering Committee*

4:45 pm **Recess**

4:45 pm **Optional Dinner**
STAC Staff will share a list of nearby restaurants within walking distance of the workshop location.

Wednesday, July 9, 2025

8:45 am **Coffee & Light Breakfast (Provided)**

9:00 am **Panel Discussion: Reflection on Day 1 and Objectives for Day 2**
This panel will provide a brief summary of Day 1's outcomes and set the stage for Day 2, focusing on identifying opportunities and challenges for implementing effective and scalable market-based solutions. Panelists will discuss key takeaways from the previous day and introduce the day's goal of drafting actionable recommendations for the Chesapeake Bay Program, aimed at advancing practices and strategies.

Moderator: Leah Palm-Forster, Associate Professor of Applied Economics, University of Delaware, and workshop Co-chair

Panelists:

- Kristen Hughes Evans, Executive Director, Sustainable Chesapeake
- Patrick Fleming, Professor of Economics and Public Policy, Franklin & Marshall
- Jenna Mitchell Beckett, Agriculture Program Director, Alliance for the Chesapeake Bay

9:30 am **Panel Discussion: Decision-Making: Private & Public Sector Priorities**

Panelists will examine how food companies, agencies, and funders prioritize sustainability investments, including criteria for Pay-for-Performance programs and policy barriers. The discussion will highlight alignment opportunities between public-sector priorities and private-sector actions, identifying high-impact areas where public support could reduce investment risks. Experts from Land O' Lakes, NRCS, NFWF and dairy cooperatives will share insights.

Moderator: Tim Male, Executive Director, Environmental Policy Innovation Center

Panelists:

- Kristy Miron, Manager, Execution Sustainability & Animal Care Member Relations, Land O'Lakes
- Janae Klinger, Director of Animal Care & Sustainability, Maryland & Virginia Milk Producers Cooperative
- Denise Coleman, State Conservationist, PA Natural Resources Conservation Service
- Jake Reilly, Director, Chesapeake Bay Programs at National Fish and Wildlife Foundation

10:45 am **20-minute Break**

11:05 am **Panel Discussion: Scalability: Market-Based Incentives for Ag Conservation**

This session will explore how market-driven approaches can accelerate conservation adoption, focusing on barriers like farmer capacity and private investment gaps. Panelists will discuss practical solutions, including supply-chain partnerships and financial incentives, while addressing on-the-ground needs for water quality, changing conditions, and biodiversity goals.

Moderator: Kristen Hughes Evans, Executive Director, Sustainable Chesapeake

Panelists:

- Janae Klinger, Director of Animal Care & Sustainability, Maryland & Virginia Milk Producers Cooperative
- Andy Young, Operations Coach, Keystone Dairy
- Jeremy Weaver, Owner and President, Weaver Environmental Consulting
- Scott Raubenstine, Vice President Agricultural Services, Perdue AgriRecycle – Regenerative Agriculture Program

12:00 pm **Lunch (provided)**

1:00 pm **Small Breakout Group Session**

2:25 pm **Breakout Groups Report Out**

2:55 pm **20-minute Break**

3:15 pm **Group Discussion: Synthesis and Next Steps** – *led by workshop Steering Committee*

This session will summarize key takeaways from both days and focus on identifying three priority areas for follow-up. Participants will discuss actionable next steps, research needs, and recommendations to advance market-based solutions for the Chesapeake Bay Program.

4:00 pm **Closing Remarks and Workshop Conclusion** – *led by workshop Co-Chairs*

4:30 pm **Adjourn**

Appendix C: Workshop Participants

Name	Affiliation
Ashley Allen Jones	Conservation Innovation Fund; i2Capital Corp
Jenna Beckett	Alliance for the Chesapeake Bay
Jess Blackburn	Stakeholders' Advisory Committee; Alliance for the Chesapeake Bay
Katie Brownson	US Forest Service (USFS)
Elliott Campbell	MD Dept of Natural Resources (MD DNR)
Ruth Cassilly	University of Maryland (UMD); Chesapeake Bay Program Office (CBPO)
Emma Chaplin	Penn State University (PSU)
John Cox	Lancaster Clean Water Partners; (formerly) Turkey Hill Dairy
Callan Dever	Conservation Innovation Fund
Matt Ehrhart	Stroud Water Research Center
Patrick Fleming	Franklin & Marshall College
Andrew Gavin	Susquehanna River Basin Commission
Helen Golimowski	Devereux Consulting
Jeremy Hanson	Chesapeake Research Consortium (CRC); Water Quality Goal Implementation Team (WQ GIT)
Aaron Harris	Land O' Lakes

Name	Affiliation
Janae Klinger	Maola Local Dairies
Scott Knoche	Morgan State University, PEARL; STAC
Yusuke Kuwayama	University of Maryland, Baltimore County (UMBC); STAC
Rachel Lamb	MD Dept of the Environment (MDE)
Christina Lyerly	MD Dept of the Environment (MDE)
Timothy Male	Environmental Policy Innovation Center (EPIC)
David Newburn	University of Maryland (UMD)
Leah Palm-Forster	University of Delaware (UDel); STAC
Jonathan Rak	VA Dept of Environmental Quality (VA DEQ)
Sara Ramotnik	Choose Clean Water Coalition; Stakeholders' Advisory Committee
Scott Raubenstine	Perdue AgriBusiness
Jake Reilly	National Fish and Wildlife Foundation (NFWF)
Maruicio Rosales	Alliance for the Chesapeake Bay
Timothy Rosen	ShoreRivers
Matt Royer	Penn State University (PSU)

Elizabeth Hoffman	MD Dept of Agriculture
Matt Houser	The Nature Conservancy (TNC)
Eric Hughes	US Environmental Protection Agency (US EPA)
Kristen Hughes Evans	Sustainable Chesapeake
Harry Huntley	Environmental Policy Innovation Center (EPIC)
Jeni Keisman	US Geological Survey (USGS); STAC
Jason Keppler	MD Dept of Agriculture
Marel King	Chesapeake Bay Commission (CBC)
Caroline Kleis	Chesapeake Research Consortium (CRC)
Brooke Landry	MD Dept of Natural Resources (MD DNR)

Mike Runge	US Geological Survey (USGS); STAC
Kristen Saacke Blunk	Headwaters LLC
Brittany Smith	Alliance for the Chesapeake Bay
Kurt Stephenson	Virginia Tech (VT)
Patrick Thompson	Energy Works
Lisa Wainger	University of Maryland, Center for Environmental Science (UMCES)
Steven Wallander	US Dept of Agriculture - Economic Research Service (USDA-ERS)
Douglas Wolgang	PA State Conservation Commission
Sarah Xenophon	PA State Conservation Commission

Appendix D: Panel Questions

Panel Discussion: Corporate Sustainability Programs - Opportunities to Align with the Chesapeake Bay Restoration

Moderator: Mauricio Rosales, Senior Agriculture Projects Manager, Alliance for the Chesapeake Bay

Opening presentation: Rod Snyder, Principal, Junction Strategies, LLC. and former President of Field to Market and Senior Advisor for Agriculture for the EPA Administrator

Panelists:

- Molly Elgin McWilliams, J-Team Dairy, LLC
- Janae Klinger, Director of Animal Care & Sustainability, Maola Local Dairies
- John Cox, Chairman of the Board of Turkey Hill Dairy

Opening Questions:

- How can we change and innovate to form more effective partnerships that achieve multiple goals, including water quality goals?
- What obstacles are limiting the effectiveness and impact of corporate sustainability programs?
- What public policies are stopping companies from investing in actions that advance Chesapeake Bay goals?
- What can the public sector do to incentivize the private sector to increase actions/contributions toward water quality goals? What opportunities do you see to effectively scale programs?
- How can we better account for and measure how corporate programs are contributing to water quality goals for the Chesapeake Bay?

Panel Discussion: Saving our Watersheds through Foodsheds - Engaging the Food Supply Chain to Meet Business and Chesapeake Bay goals

Moderator: Jenna Mitchell Beckett, Agriculture Program Director, Alliance for the Chesapeake Bay

Panelists:

- Aaron Harris, Sustainability & Animal Care Specialist, Land O'Lakes, Inc.
- Scott Raubenstine, Vice President Agricultural Services, Perdue AgriRecycle - Regenerative Agriculture Program
- Annika Fuller, Sustainability Field Specialist, Dairy Farmers of America

Opening Questions:

- How can we change and innovate to form more effective partnerships that achieve multiple goals, including water quality goals?
- What obstacles are limiting the effectiveness and impact of corporate sustainability programs?
- What public policies are stopping companies from investing in actions that advance Chesapeake Bay goals?
- What can the public sector do to incentivize the private sector to increase actions/contributions toward water quality goals? What opportunities do you see to effectively scale programs?

Panel Discussion: Pay for Success

Moderator: Harry Huntley, Agriculture Policy Lead, Environmental Policy Innovation Center

Panelists:

- Kurt Stephenson, Virginia Tech, former STAC member and CESR Report co-author
- Tim Rosen, Director of Agriculture and Restoration, ShoreRivers
- Ashley Allen Jones, Founding Board Chair, Conservation Innovation Fund
- Jason Keppler, Conservation Grants Program Manager, Maryland Department of Agriculture

Opening Questions:

- What is Pay for Success, and why is it beneficial? Where is it happening now?
- How does this work in practice? What's a real project?
- How effective have those programs been?
- What are the shortcomings of these programs?
- How can we expand and improve Pay for Success?

Panel Discussion: Decision-Making: Private & Public Sector Priorities

Moderator: Tim Male, Executive Director, Environmental Policy Innovation Center

Panelists:

- Kristy Miron, Manager, Execution Sustainability & Animal Care Member Relations, Land O'Lakes
- Janae Klinger, Director of Animal Care & Sustainability, Maola Local Dairies
- Denise Coleman, State Conservationist, PA Natural Resources Conservation Service
- Jake Reilly, Director, Chesapeake Bay Programs at National Fish and Wildlife Foundation

Opening Questions:

- Given what you've heard on Day 1 and your experience, what are some ideas for changes that would enable market-based incentives to succeed?
- Where is there alignment between public and private priorities and goals?
- Where do public and private priorities diverge in ways that may prevent us from moving forward together?
- Are there levers that could help bring priorities into greater alignment? Are there areas where alignment may not be possible?
- How can we better represent rented land in these efforts, and what kinds of incentives could be shared effectively between landowners and tenants?
- What's driving corporate interest in these types of programs and incentives?

Panel Discussion: Scalability: Market-Based Incentives for Ag Conservation

Moderator: Kristen Hughes Evans, Executive Director, Sustainable Chesapeake

Panelists:

- Janae Klinger, Director of Animal Care & Sustainability, Maola Local Dairies
- Andy Young, Operations Coach, Keystone Dairy
- Jeremy Weaver, Owner and President, Weaver Environmental Consulting
- Scott Raubenstine, Vice President Agricultural Services, Perdue AgriRecycle – Regenerative Agriculture Program

Opening Questions:

- Please briefly introduce yourselves and provide an overview of your company or your client's sustainability initiatives AND what is your company's vision for scalability goals (e.g. total impact like # farmers, #acres, Scope 3 emissions, efficiency, equity). If you had all the time, talent, and treasure you needed, where would you all be with respect to scalability?
- In your opinion, what are the top reasons why your scalability goals have not been met already?
- What market-based incentives (e.g. nutrient trading, carbon markets, ecosystem service payments) can be improved, expanded or created to reward farmers and landowners for implementing conservation practices in the Bay watershed?
- How can private sector actors (agribusinesses, retailers, food companies) be engaged to support and invest in conservation practices that benefit Bay water quality and ecosystem health?
- What barriers (e.g. regulatory, financial, technical) currently prevent wider adoption of conservation practices like cover cropping, no-till, or riparian buffers in the region?
- How can state and federal conservation programs (like EQIP, CSP, or the Chesapeake Bay Program) be better aligned with performance-based outcomes and local watershed needs?
- What role can improved MRV (measurement, reporting, verification) systems play in building trust, tracking outcomes, and scaling conservation investment across the Bay watershed?

Appendix E: List of Figures

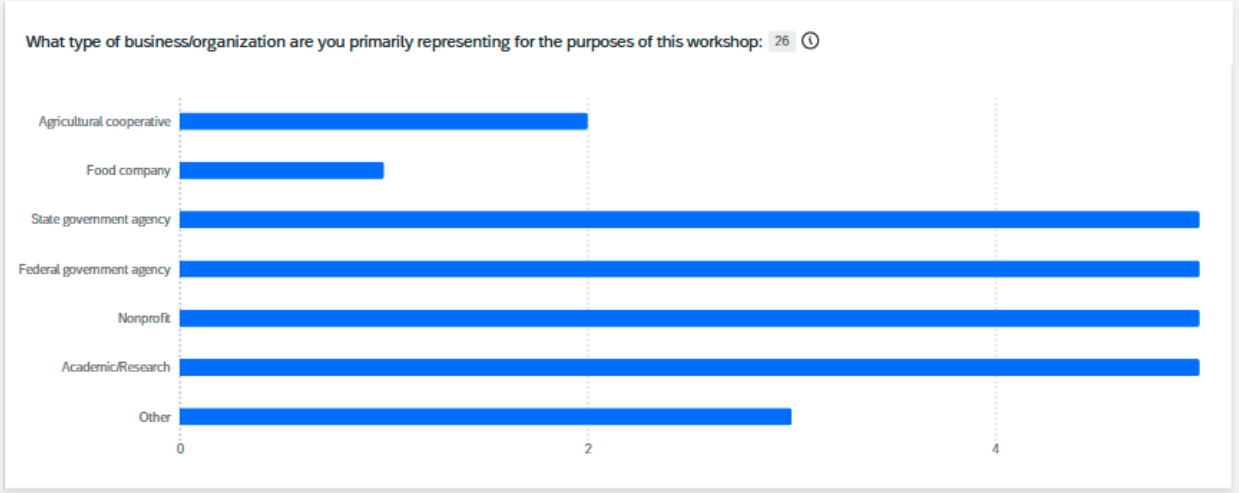
Appendix F: Post-Workshop Qualtrics Survey Output

The post-workshop Qualtrics survey received 34 responses to the background questions on participant affiliation and years of experience. Of those respondents, 24 completed the question asking them to rate the importance of breakout-derived recommendations on a four-point scale ranging from not important to extremely important, and 21 completed the follow-up ranking questions for recommendations they had identified as "very important" or "extremely important." The survey also included an open-ended question inviting additional reflections on the workshop, key priorities, and issues to consider in drafting the report. The figures and tables in this appendix present the exported survey results.

The recommendations respondents were asked to rate, and then rank if selected as "Very Important" or "Extremely Important," were:

- Develop a mapping/matrix to compare public and private sector goals, KPIs, and metrics, and establish clear definitions of terms - identify and focus on the largest companies that source from within the CBW.
- Create opportunities for repeated engagement and interactions across public and private sectors (with representation across the full supply chain) to build relationships and trust.
- Develop a platform that would act as a clearinghouse for market-based programs across the region, and facilitate data sharing among farmers and the private and public sectors.
- Develop stories of successful market-based approaches and related challenges, and share across the CB partnership to motivate engagement.
- Identify and quantify co-benefits (water quality and conservation, biodiversity, GHG impacts, animal welfare) from a suite of agricultural practices, including practices already acknowledged in CAST and other high-impact practices.
- Acknowledge conservation successes that are not driven by N, P, and S metrics; e.g., establish biodiversity metrics for Bay conservation.
- Develop alternative models that work at fine scales to predict outcomes of agricultural practices and include co-benefits.
- Develop lower-cost measurement, monitoring, reporting, and verification (MMRV) options through remote sensing, citizen science, and simpler but reliable metrics that reduce transaction costs while maintaining precision levels required by key stakeholders.
- Maintain current state-level pay-for-success programs for multiple years with careful evaluation and reporting of outcomes (e.g., funding, practices, acres, benefits, etc.).
- Fund trials and "sandboxing" initiatives in high priority areas of the CBW - require outcome monitoring and reporting.
- Advance the science needed to optimize market-based programs, including pay-for success, and improve understanding of behavioral barriers limiting program participation, adoption of ag practices, and provision of benefits.

- Develop incentives for addressing the mass balance problem including manure transport and processing options.
- Align state-level certification programs and report data across state lines - determine if companies will recognize these certifications.
- Identify specific policies limiting solutions and innovation, and develop innovative financing options including state tax credits and block grants (across all states).
- Develop a common application for financing agricultural practices/innovations to increase consistency, streamline the process, and reduce transaction costs.
- Increase flexibility of financing, including making funds available to producer groups (e.g., dairy cooperatives) who already have trusted partnerships.
- Evaluate what types of financing can promote large and scalable projects that are attractive to the private sector and effectively achieve CB goals.



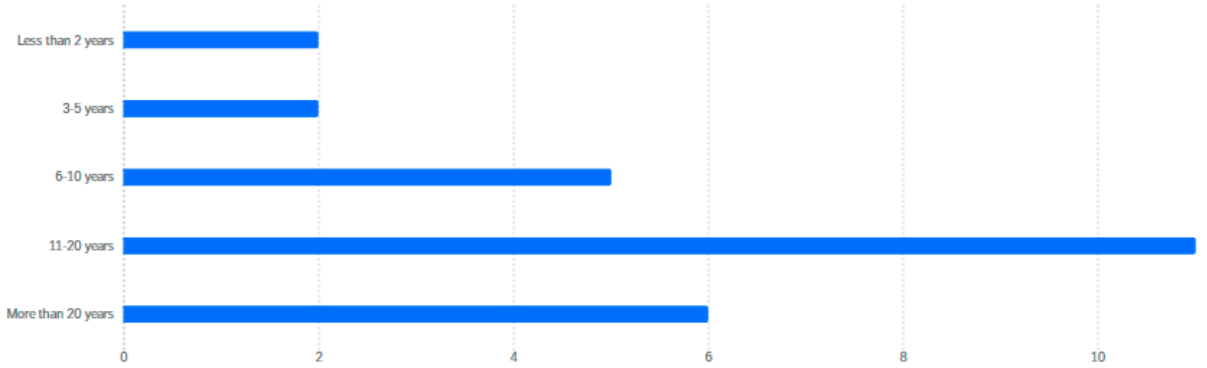
What type of business/organization are you primarily representing for the purposes of this workshop: 26

Q2 - What type of business/organization are you primarily representing for the purposes of this workshop: - Selected Choice	Count	Count
Agricultural cooperative	8%	2
Food company	4%	1
State government agency	19%	5
Federal government agency	19%	5
Nonprofit	19%	5
Academic/Research	19%	5
Other	12%	3

What type of business/organization are you primarily representing for the purposes of this workshop: 34

Average (Q2 - What type of business/organization are you primarily representing for the purposes of this workshop: - Selected Choice)	5.42
Minimum (Q2 - What type of business/organization are you primarily representing for the purposes of this workshop: - Selected Choice)	2.00
Maximum (Q2 - What type of business/organization are you primarily representing for the purposes of this workshop: - Selected Choice)	8.00
Standard Deviation (Q2 - What type of business/organization are you primarily representing for the purposes of this workshop: - Selected Choice)	1.69

How long have you been working in this type of business/organization? 26



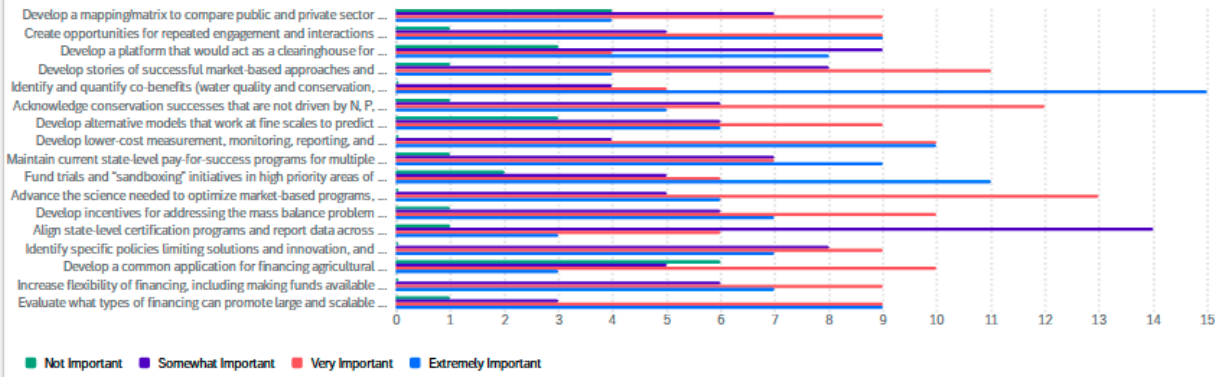
How long have you been working in this type of business/organization? 26

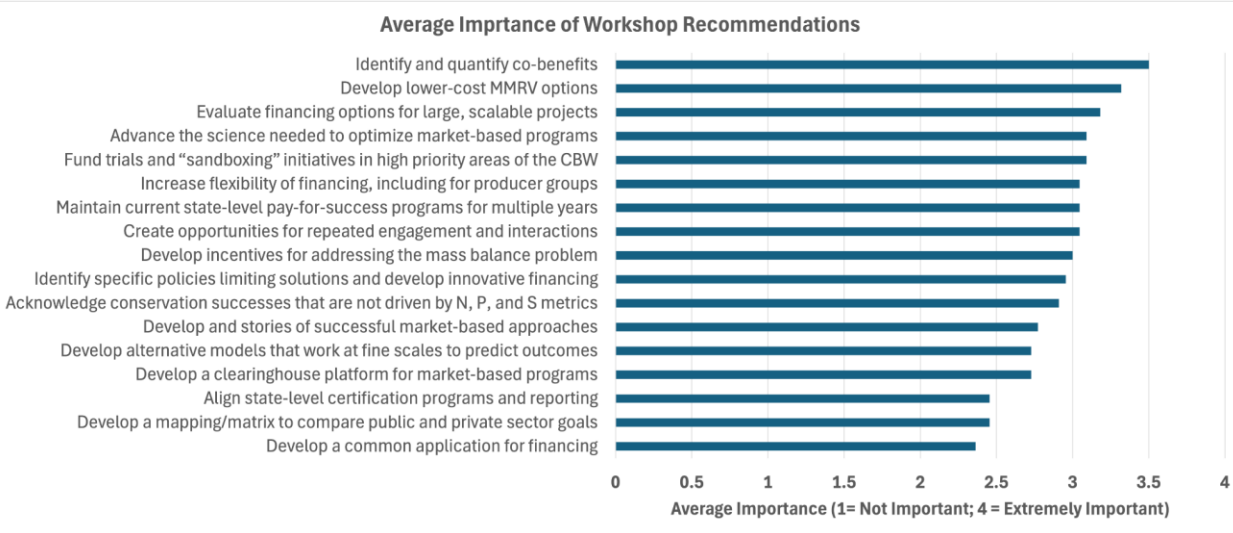
Q10 - How long have you been working in this type of business/organization?	Count	Count
Less than 2 years	8%	2
3-5 years	8%	2
6-10 years	19%	5
11-20 years	42%	11
More than 20 years	23%	6

How long have you been working in this type of business/organization? 34

Average (Q10 - How long have you been working in this type of business/organization?)	3.65
Minimum (Q10 - How long have you been working in this type of business/organization?)	1.00
Maximum (Q10 - How long have you been working in this type of business/organization?)	5.00
Standard Deviation (Q10 - How long have you been working in this type of business/organization?)	1.14
Count	34

The following recommendations came out of the breakout group activity on day 2. Please indicate t... 24





The following recommendations came out of the breakout group activity on day 2. Please indicate t... 24

The following recommendations came out of the breakout group activity on da...	Not Important	Somewhat Important	Very Important	Extremely Important
Develop a mapping/matrix to compare public and private sector goals, KPIs, and metrics, and establish clear definitions of terms - identify and focus on the largest companies that source from within the CBW	4	7	9	4
Create opportunities for repeated engagement and interactions across public and private sectors (with representation across the full supply chain) to build relationships and trust	1	5	9	9
Develop a platform that would act as a clearinghouse for market-based programs across the region, and facilitate data sharing among farmers and the private and public sectors.	3	9	4	8
Develop stories of successful market-based approaches and related challenges, and share across the CB partnership to motivate engagement	1	8	11	4
Identify and quantify co-benefits (water quality and conservation, biodiversity, GHG impacts, animal welfare) from a suite of agricultural practices, including practices already acknowledged in CAST and other high-impact practices	0	4	5	15
Acknowledge conservation successes that are not driven by N, P, and S metrics: e.g., establish biodiversity metrics for Bay conservation.	1	6	12	5
Develop alternative models that work at fine scales to predict outcomes of agricultural practices and include co-benefits	3	6	9	6

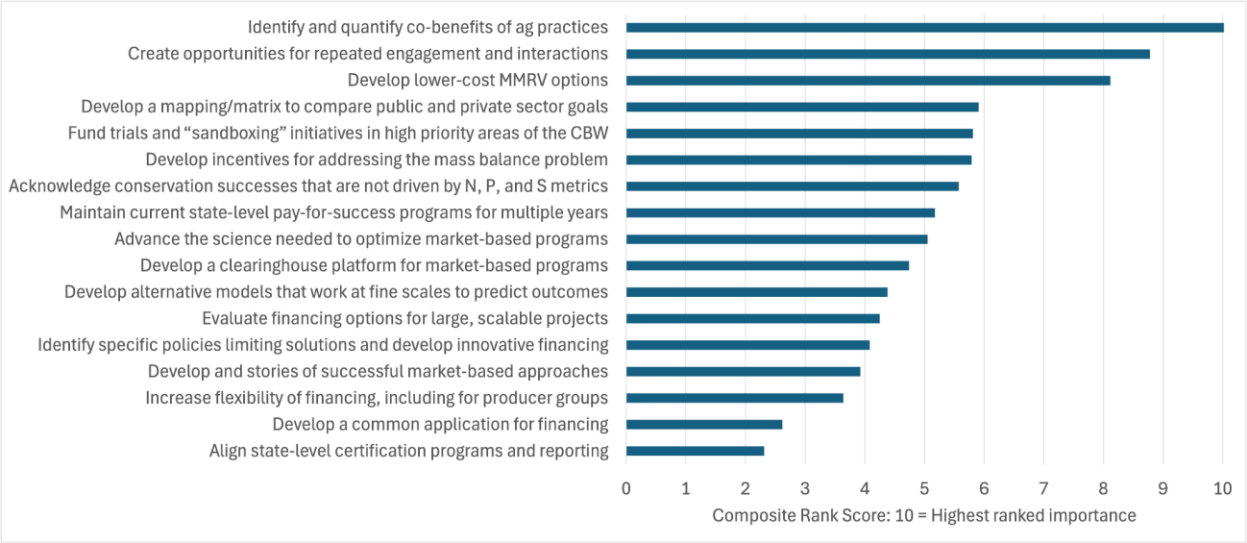
The following recommendations came out of the breakout group activity on da...	Not Important	Somewhat Important	Very Important	Extremely Important
Develop lower-cost measurement, monitoring, reporting, and verification (MMRV) options through remote sensing, citizen science, and simpler but reliable metrics that reduce transaction costs while maintaining precision levels required by key stakeholders.	0	4	10	10
Maintain current state-level pay-for-success programs for multiple years with careful evaluation and reporting of outcomes (e.g., funding, practices, acres, benefits, etc.).	1	7	7	9
Fund trials and "sandboxing" initiatives in high priority areas of the CBW - require outcome monitoring and reporting	2	5	6	11
Advance the science needed to optimize market-based programs, including pay-for success, and improve understanding of behavioral barriers limiting program participation, adoption of ag practices, and provision of benefits.	0	5	13	6
Develop incentives for addressing the mass balance problem including manure transport and processing options.	1	6	10	7
Align state-level certification programs and report data across state lines - determine if companies will recognize these certifications.	1	14	6	3
Identify specific policies limiting solutions and innovation, and develop innovative financing options including state tax credits and block grants (across all states).	0	8	9	7
Develop a common application for financing agricultural practices/innovations to increase consistency, streamline the process, and reduce transaction costs.	6	5	10	3
Increase flexibility of financing, including making funds available to producer groups (e.g., dairy cooperatives) who already have trusted partnerships.	0	6	9	7
Evaluate what types of financing can promote large and scalable projects that are attractive to the private sector and effectively achieve CB goals.	1	3	9	9

The following recommendations came out of the breakout group activity on day 2. Please indicate t... 24

The following recommendations came out of the breakout group activity on da...	Average (The following recommendations came out of the breakout group activity on da...)	Minimum (The following recommendations came out of the breakout group activity on da...)	Maximum (The following recommendations came out of the breakout group activity on da...)	Standard Deviation (The following recommendations came out of the breakout group activity on da...)	Count
Develop a mapping/matrix to compare public and private sector goals, KPIs, and metrics, and establish clear definitions of terms - identify and focus on the largest companies that source from within the CBW	2.54	1.00	4.00	0.96	24

The following recommendations came out of the breakout group activity on da...	Average (The following recommendations came out of the breakout group activity on da...)	Minimum (The following recommendations came out of the breakout group activity on da...)	Maximum (The following recommendations came out of the breakout group activity on da...)	Standard Deviation (The following recommendations came out of the breakout group activity on da...)	Count
Create opportunities for repeated engagement and interactions across public and private sectors (with representation across the full supply chain) to build relationships and trust	3.08	1.00	4.00	0.86	24
Develop a platform that would act as a clearinghouse for market-based programs across the region, and facilitate data sharing among farmers and the private and public sectors.	2.71	1.00	4.00	1.06	24
Develop stories of successful market-based approaches and related challenges, and share across the CB partnership to motivate engagement	2.75	1.00	4.00	0.78	24
Identify and quantify co-benefits (water quality and conservation, biodiversity, GHG impacts, animal welfare) from a suite of agricultural practices, including practices already acknowledged in CAST and other high-impact practices	3.46	2.00	4.00	0.76	24
Acknowledge conservation successes that are not driven by N, P, and S metrics: e.g., establish biodiversity metrics for Bay conservation.	2.88	1.00	4.00	0.78	24
Develop alternative models that work at fine scales to predict outcomes of agricultural practices and include co-benefits	2.75	1.00	4.00	0.97	24
Develop lower-cost measurement, monitoring, reporting, and verification (MMRV) options through remote sensing, citizen science, and simpler but reliable metrics that reduce transaction costs while maintaining precision levels required by key stakeholders.	3.25	2.00	4.00	0.72	24
Maintain current state-level pay-for-success programs for multiple years with careful evaluation and reporting of outcomes (e.g., funding, practices, acres, benefits, etc.).	3.00	1.00	4.00	0.91	24

The following recommendations came out of the breakout group activity on da...	Average (The following recommendations came out of the breakout group activity on da...)	Minimum (The following recommendations came out of the breakout group activity on da...)	Maximum (The following recommendations came out of the breakout group activity on da...)	Standard Deviation (The following recommendations came out of the breakout group activity on da...)	Count
Fund trials and "sandboxing" initiatives in high priority areas of the CBW - require outcome monitoring and reporting	3.08	1.00	4.00	1.00	24
Advance the science needed to optimize market-based programs, including pay-for success, and improve understanding of behavioral barriers limiting program participation, adoption of ag practices, and provision of benefits.	3.04	2.00	4.00	0.68	24
Develop incentives for addressing the mass balance problem including manure transport and processing options.	2.96	1.00	4.00	0.84	24
Align state-level certification programs and report data across state lines - determine if companies will recognize these certifications.	2.46	1.00	4.00	0.76	24
Identify specific policies limiting solutions and innovation, and develop innovative financing options including state tax credits and block grants (across all states).	2.96	2.00	4.00	0.79	24
Develop a common application for financing agricultural practices/innovations to increase consistency, streamline the process, and reduce transaction costs.	2.42	1.00	4.00	1.00	24
Increase flexibility of financing, including making funds available to producer groups (e.g., dairy cooperatives) who already have trusted partnerships.	3.05	2.00	4.00	0.77	22
Evaluate what types of financing can promote large and scalable projects that are attractive to the private sector and effectively achieve CB goals.	3.18	1.00	4.00	0.83	22



Please rank the recommendations you selected as "Extremely Important" in the previous list (1 is the highest rank). You may also write in other recommendations, if you feel your ideas were not adequately captured in the previous list. 21

Please rank the recommendations you selected as "Extremely Important" in th...	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Other	2	0	1	2	3	4	2	2	1	1	0	0	0	1
Other	0	1	0	1	3	4	4	2	2	0	1	0	1	0
Develop a mapping/matrix to compare public and private sector goals, KPIs, and metrics, and establish clear definitions of terms - identify and focus on the largest companies that source from within the CBW	2	1	0	1	0	0	0	0	0	0	0	0	0	0
Create opportunities for repeated engagement and interactions across public and private sectors (with representation across the full supply chain) to build relationships and trust	4	3	0	0	2	0	0	0	0	0	0	0	0	0
Develop a platform that would act as a clearinghouse for market-based programs across the region, and facilitate data sharing among farmers and the private and public sectors.	2	0	1	1	2	1	0	0	0	0	0	0	0	0
Develop stories of successful market-based approaches and related challenges, and share across the CB partnership to motivate engagement	0	1	0	1	0	1	0	0	0	0	1	0	0	0
Identify and quantify co-benefits (water quality and conservation, biodiversity, GHG impacts, animal welfare) from a suite of agricultural practices, including practices already acknowledged in CAST and other high-impact practices	4	6	1	1	1	0	0	0	0	0	0	1	0	0

Please rank the recommendations you selected as "Extremely Important" in th...	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Acknowledge conservation successes that are not driven by N, P, and S metrics: e.g., establish biodiversity metrics for Bay conservation.	1	0	1	2	1	0	0	0	0	0	0	0	0	0
Develop alternative models that work at fine scales to predict outcomes of agricultural practices and include co-benefits	0	1	3	1	0	0	0	0	1	0	0	0	0	0
Develop lower-cost measurement, monitoring, reporting, and verification (MMRV) options through remote sensing, citizen science, and simpler but reliable metrics that reduce transaction costs while maintaining precision levels required by key stakeholders.	0	1	5	3	0	0	1	0	0	0	0	0	0	0
Maintain current state-level pay-for-success programs for multiple years with careful evaluation and reporting of outcomes (e.g., funding, practices, acres, benefits, etc.).	1	0	0	2	2	1	2	0	0	0	0	0	0	0
Fund trials and "sandboxing" initiatives in high priority areas of the CBW - require outcome monitoring and reporting	3	0	3	0	1	2	0	0	0	0	0	0	0	0
Advance the science needed to optimize market-based programs, including pay-for success, and improve understanding of behavioral barriers limiting program participation, adoption of ag practices, and provision of benefits.	0	2	0	0	0	0	1	2	0	0	0	0	0	0
Develop incentives for addressing the mass balance problem including manure transport and processing options.	1	2	1	1	0	0	0	1	0	0	0	0	0	0
Align state-level certification programs and report data across state lines - determine if companies will recognize these certifications.	0	1	0	0	1	1	0	0	0	0	0	0	0	0
Identify specific policies limiting solutions and innovation, and develop innovative financing options including state tax credits and block grants (across all states).	0	2	0	2	1	0	0	1	0	0	0	0	0	0
Develop a common application for financing agricultural practices/innovations to increase consistency, streamline the process, and reduce transaction costs.	0	0	1	0	0	1	1	0	0	0	0	0	0	0

Please rank the recommendations you selected as "Extremely Important" in th...	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Increase flexibility of financing, including making funds available to producer groups (e.g., dairy cooperatives) who already have trusted partnerships.	1	0	1	0	1	1	0	1	1	1	0	0	0	0
Evaluate what types of financing can promote large and scalable projects that are attractive to the private sector and effectively achieve CB goals.	0	0	2	1	1	0	2	0	2	0	0	0	0	0

Please rank the recommendations you selected as "Very Important" in the earlier list (1 is the highest rank). You may also write in other recommendations, if you feel your ideas were not adequately captured in the previous list. 21

Please rank the recommendations you selected as "Very Important" in the earlier list (1 is the highest rank). You may also write in other recommendations, if you feel your ideas were not adequately captured in the previous list. 21

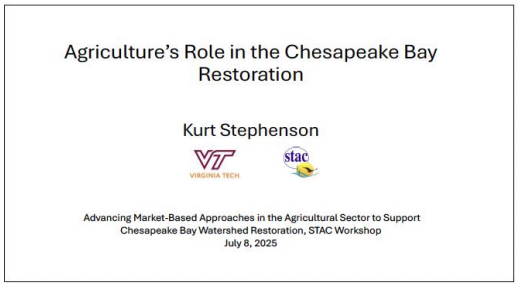
Please rank the recommendations you selected as "Very Important" in the ear...	1	2	3	4	5	6	7	8	9	10	11	12
Other	3	0	1	0	1	3	4	3	3	0	1	1
Other	0	3	0	1	0	2	3	3	3	4	1	0
Develop a mapping/matrix to compare public and private sector goals, KPIs, and metrics, and establish clear definitions of terms - identify and focus on the largest companies that source from within the CBW	4	0	0	2	2	0	0	0	0	0	0	0
Create opportunities for repeated engagement and interactions across public and private sectors (with representation across the full supply chain) to build relationships and trust	0	4	1	0	0	1	1	0	0	0	0	0
Develop a platform that would act as a clearinghouse for market-based programs across the region, and facilitate data sharing among farmers and the private and public sectors.	0	1	0	1	1	0	0	0	0	0	0	0

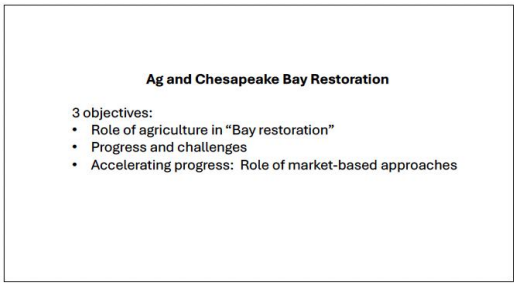
Please rank the recommendations you selected as "Very Important" in the ear...	1	2	3	4	5	6	7	8	9	10	11	12
Develop stories of successful market-based approaches and related challenges, and share across the CB partnership to motivate engagement	2	1	2	1	1	1	1	0	0	0	0	0
Identify and quantify co-benefits (water quality and conservation, biodiversity, GHG impacts, animal welfare) from a suite of agricultural practices, including practices already acknowledged in CAST and other high-impact practices	1	1	0	0	1	1	0	0	0	0	0	0
Acknowledge conservation successes that are not driven by N, P, and S metrics: e.g., establish biodiversity metrics for Bay conservation.	0	2	2	4	1	0	1	0	0	0	0	0
Develop alternative models that work at fine scales to predict outcomes of agricultural practices and include co-benefits	0	1	3	2	0	1	1	0	0	0	0	0
Develop lower-cost measurement, monitoring, reporting, and verification (MMRV) options through remote sensing, citizen science, and simpler but reliable metrics that reduce transaction costs while maintaining precision levels required by key stakeholders.	2	1	2	1	1	1	0	0	0	0	0	0
Maintain current state-level pay-for-success programs for multiple years with careful evaluation and reporting of outcomes (e.g., funding, practices, acres, benefits, etc.).	2	1	1	1	0	0	0	1	0	0	0	0
Fund trials and "sandboxing" initiatives in high priority areas of the CBW - require outcome monitoring and reporting	0	0	0	3	2	0	1	0	0	0	0	0
Advance the science needed to optimize market-based programs, including pay-for success, and improve understanding of behavioral barriers limiting program participation, adoption of ag practices, and provision of benefits.	2	2	2	2	0	3	1	0	0	0	0	0
Develop incentives for addressing the mass balance problem including manure transport and processing options.	1	2	0	1	4	0	0	1	0	0	0	0
Align state-level certification programs and report data across state lines - determine if companies will recognize these certifications.	1	0	0	0	1	2	0	0	1	0	0	0
Identify specific policies limiting solutions and innovation, and develop innovative financing options including state tax credits and block grants (across all states).	0	1	2	1	0	1	2	0	0	0	0	0
Develop a common application for financing agricultural practices/innovations to increase consistency, streamline the process, and reduce transaction costs.	1	0	4	0	0	0	1	3	0	0	0	0

Please rank the recommendations you selected as "Very Important" in the ear...	1	2	3	4	5	6	7	8	9	10	11	12
Increase flexibility of financing, including making funds available to producer groups (e.g., dairy cooperatives) who already have trusted partnerships.	0	1	0	0	3	1	1	0	1	1	0	0
Evaluate what types of financing can promote large and scalable projects that are attractive to the private sector and effectively achieve CB goals.	2	0	0	0	1	2	1	2	0	0	0	0

Appendix G: Presentation Slides

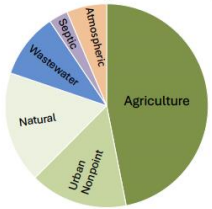
Agriculture's Role in the Chesapeake Bay Restoration: Scaling up Ag conservation — Kurt Stephenson (VT)





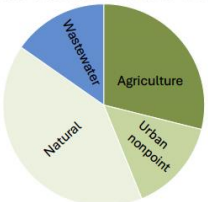
Role of Agriculture to Bay Nutrient Reduction Goals

Sources of nitrogen loads to Bay



256 million lbs/yr of Nitrogen entering the Chesapeake Bay (estimated by CAST 23)
Goal: 210 mil lbs/yr

Sources of phosphorus loads to Bay



13.2million lbs/yr of phosphorus entering the Chesapeake Bay (estimated by CAST 23)
Goal: 12.7 mil lbs/yr

Progress and Challenges
Nitrogen

Annual rate of change in nonpoint source N loads

	1985-2009	2009-2023
Agriculture	- 1.45 mil/lbs/yr	- 0.14 mil/lbs/yr
Urban Nonpoint	+ 0.45 mil/lbs/yr	+ 0.10 mil/lbs/yr
Net change in NPS	***-1.00 mil/lbs/yr***	***- 0.04 mil/lbs/yr***

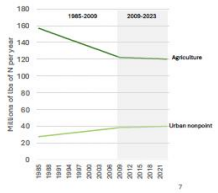
6

Data Source: CAST23

Progress and Challenges
Nitrogen

Annual rate of change in nonpoint source N loads

	1985-2009	2009-2023
Agriculture	- 1.45 mil/lbs/yr	- 0.14 mil/lbs/yr
Urban Nonpoint	+ 0.45 mil/lbs/yr	+ 0.10 mil/lbs/yr
Net change in NPS	***-1.00 mil/lbs/yr***	***- 0.04 mil/lbs/yr***



7

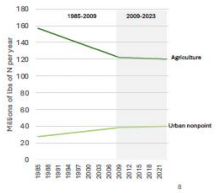
Data Source: CAST23

Progress and Challenges
Nitrogen

Annual rate of change in nonpoint source N loads

	1985-2009	2009-2023
Agriculture	- 1.45 mil/lbs/yr	- 0.14 mil/lbs/yr
Urban Nonpoint	+ 0.45 mil/lbs/yr	+ 0.10 mil/lbs/yr
Net change in NPS	***-1.00 mil/lbs/yr***	***- 0.04 mil/lbs/yr***

Estimated additional N reductions to achieve the TMDL target: **46 mil/lb**



8

Data Source: CAST23

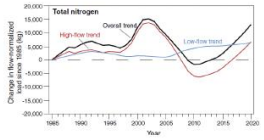
Smith Creek VA

Showcase watershed
4x increase in BMPs in last 2 decades
Increase in animal units

9

Smith Creek VA

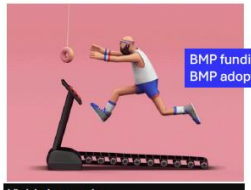
Showcase watershed
4x increase in BMPs in last 2 decades
Increase in animal units



Source: Webber et al, 2024, Evaluating Water-quality Trends in Agricultural Watersheds prioritized for best management practice implementation, *J of the Amer. Water Resources Association.*

Progress and Challenges:
Nitrogen

Progress and Challenges:
Nitrogen



BMP funding increasing
BMP adoption increasing

Yields increasing
Animal numbers increasing

Progress and Challenges:
Phosphorus

Progress and Challenges:
Phosphorus

Annual rate of change in nonpoint source P loads (CAST estimates)

	1985-2009	2009-2023
Agriculture	- 130k lbs/yr	- 40k lbs/yr
Urban Nonpoint	+ 20k/lbs/yr	- 20k lbs/yr
Net change in NPS	***-110k lbs/yr***	***- 60k lbs/yr***

Data Source: CAST23

Progress and Challenges:
Phosphorus

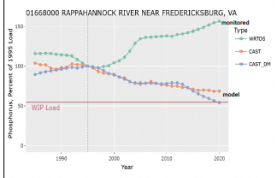
Annual rate of change in nonpoint source P loads (CAST estimates)

	1985-2009	2009-2023
Agriculture	- 130k lbs/yr	- 40k lbs/yr
Urban Nonpoint	+ 20k/lbs/yr	- 20k lbs/yr
Net change in NPS	***-110k lbs/yr***	***- 60k lbs/yr***

Estimated additional N reductions to achieve the TMDL target: **450k/lb/yr**

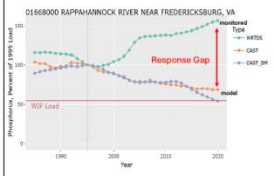
Data Source: CAST23

Progress and Challenges:
Phosphorus



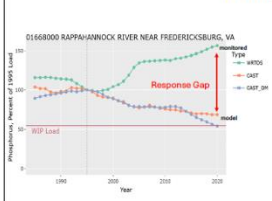
Data Source: METRIC (Monitored and Expected Total Reduction Indicator for the Chesapeake) https://wqx.chesapeakebay.net/metric/

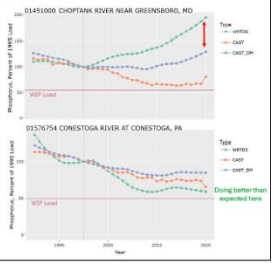
Progress and Challenges: Phosphorus



Data Source: METRIC (Monitored and Expected Total Reduction Indicator for the Chesapeake) https://wqs.chesapeakebay.net/metric/

Progress and Challenges: Phosphorus





Data Source: METRIC (Monitored and Expected Total Reduction Indicator for the Chesapeake) https://wqs.chesapeakebay.net/metric/

Phosphorus Response Gap

Long term Trends in Total Phosphorus Loads

River	Monitoring Observations	CAST Model
Susquehanna	—	↓
Potomac	↓	↓
Choptank	↑	↓
Patuxent	↓	↓
Rappahannock	↑	↓
Mattaponi	—	↑
Pamunkey	↑	↓
James	↓	↓
Appomattox	↑	↓

Increasing Loads | Decreasing Loads

19

Progress and Challenges Conclusions

Reducing pollutants while increasing ag production is a major accomplishment, but

STAC concluded that current programs were insufficient to meet TMDL targets

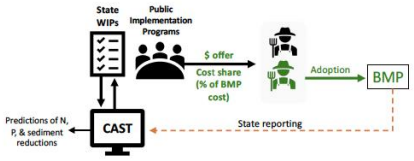
20

Data Source: CAST23

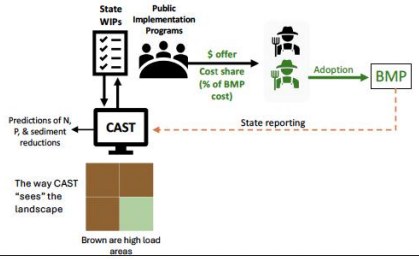
Accelerating Progress

For continued progress, need to add new approaches to implementation in addition to sustained/increasing funding

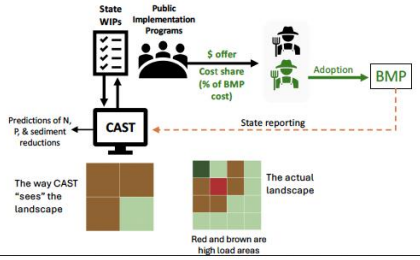
Conventional Approach



Conventional Approach



Conventional Approach



Accelerating Progress

Not just technical solutions

Need new ways of motivating people

Innovation

Technology
Knowledge
Institutions

Accelerating Progress

Market-based policies

Public Goals

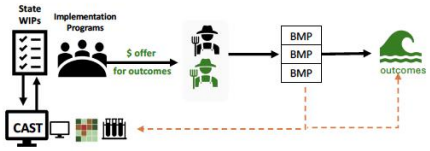
Environmental objectives
Financial incentives

Private Means

Flexibility to respond
(Financial incentives)

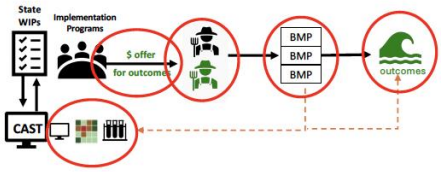
Accelerating Progress

Market-based Opportunities



Accelerating Progress

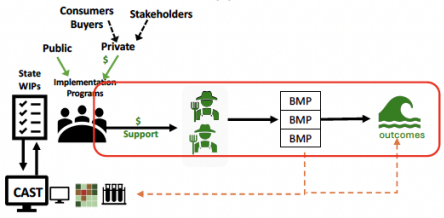
Market-based Opportunities



Examples: Flemming et al. 2021

Accelerating Progress

Market-based Opportunities

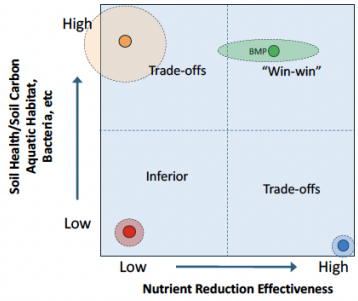


Final Thoughts

Draft 2025 Chesapeake Bay Agreement

4 Restoration Goals	21 Outcomes
Thriving Habitat and Wildlife	Blue crabs, oysters, fish habitat, wetlands, stream health, brooke trout, fish passage, SAV.
Clean Water	Water quality standards and attainment Reducing excess nitrogen, phosphorus, & sediment Toxic contaminant migration
Healthy Landscapes	Protected lands, land use decision support, healthy forests and trees, adapting to changing environmental conditions.
Engaged Communities	Stewardship, local leaders, workforce, public access, student experiences, school district planning.

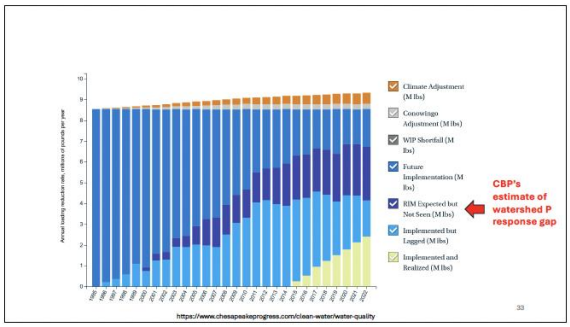
31



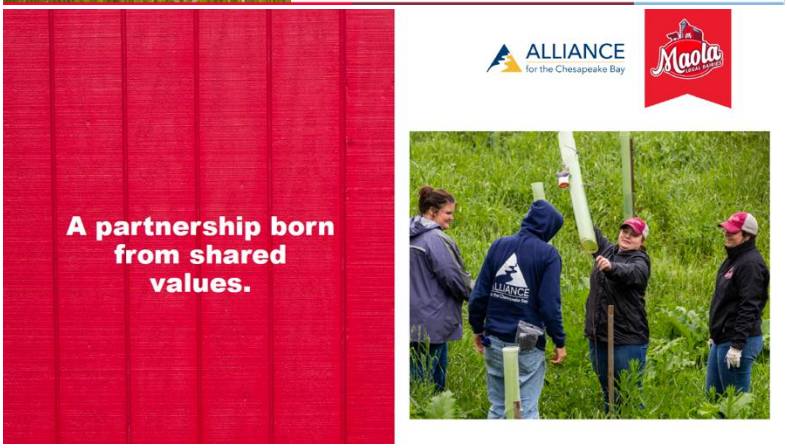
Conservation for what?

Effectiveness of BMPs to produce water quality outcomes

32


Annual loading reduction rate, millions of pounds per year
Climate Adjustment (M lbs)
Conowingo Adjustment (M lbs)
WIP Shortfall (M lbs)
Future Implementation (M lbs)
RIM Expected but Not Seen (M lbs)
Implemented but Lagged (M lbs)
Implemented and Realized (M lbs)
CBP's estimate of watershed P response gap
https://www.chesapeakeprogress.com/clean-water/water-quality
33

Corporate-Nonprofit Partnership Model: How to Collaborate Successfully to Implement Conservation on Farms — Mauricio Rosales (Alliance for the Chesapeake Bay), Janae Klinger (Maola Local Dairies)

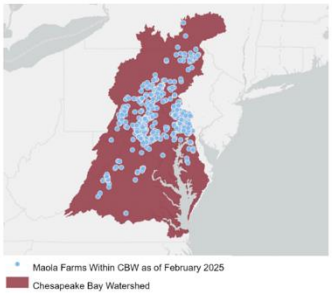


About Alliance for the Chesapeake Bay

- The Alliance brings together communities, companies, and conservationists to improve our lands and waters of the Chesapeake Bay Watershed
- Staff in Pennsylvania, Maryland, Washington DC, Virginia, New York, North Carolina
- Nearly $100M raised for farmers through partnership with Maola

We create more impactful change when we do it together

With 90% of Maola Local Dairies' farmer-owners operating within the Chesapeake Bay watershed, we are committed to environmental responsibility by implementing best management practices across our farms



Farmer-Led Sustainability

- The Alliance and Maola have been working side-by-side for over eight years, a partnership that was built through supply-chain work with Turkey Hill Dairy. Our teams understand our roles and strengths and bring those to bear via on-the-ground solutions for a more sustainable dairy supply chain.
- Since 2018, we've served over 260 farms, drafted 41 farm conservation plans, installed over 100 conservation practices, and planted 20,000 trees on agricultural lands.

Every farm, big or small, can make an impact on the local ecosystem

ALLIANCE for the Chesapeake Bay

Maola

Before

After

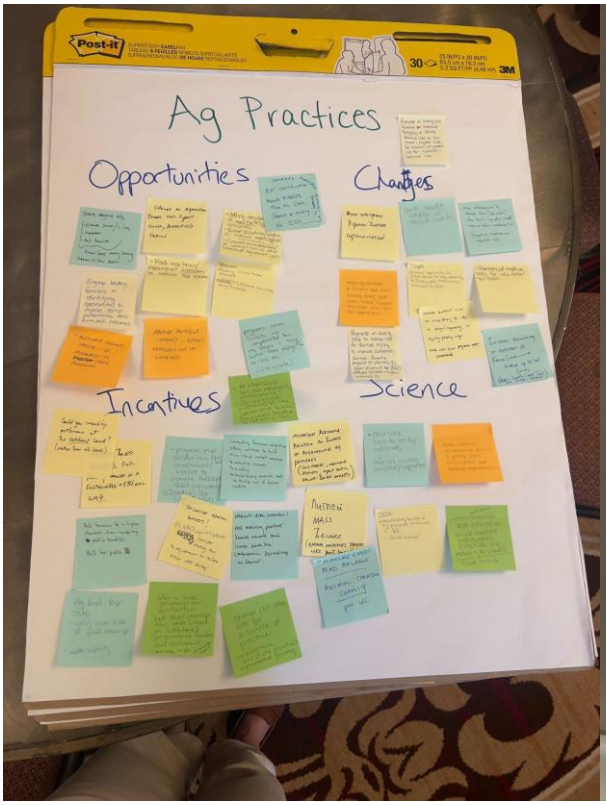
Farmer Impact

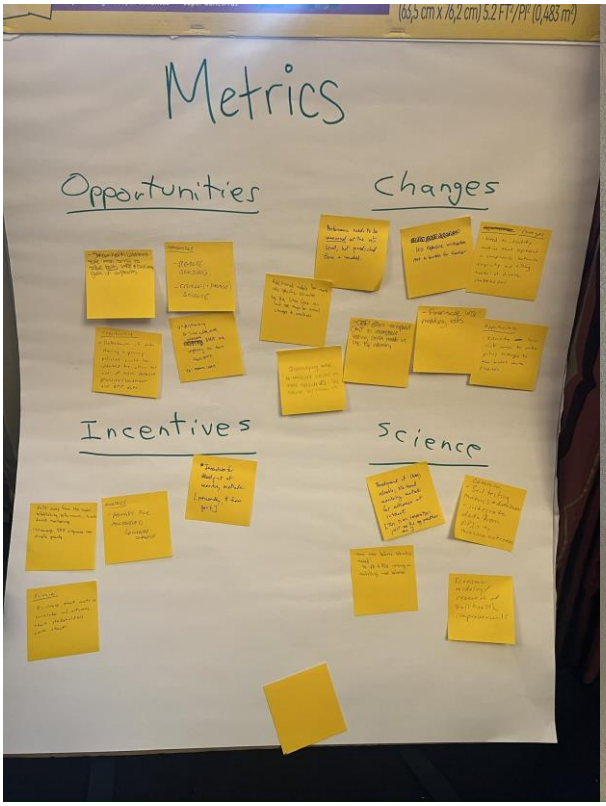
ALLIANCE for the Chesapeake Bay

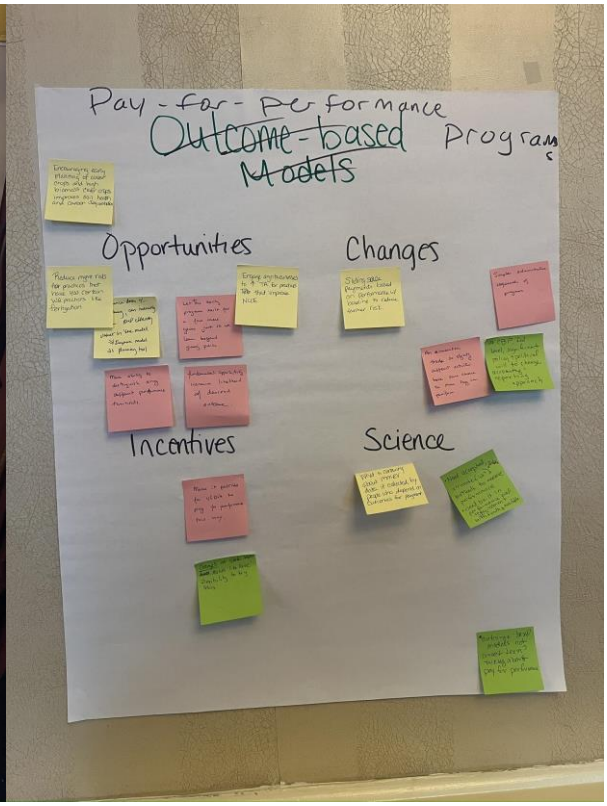
Maola

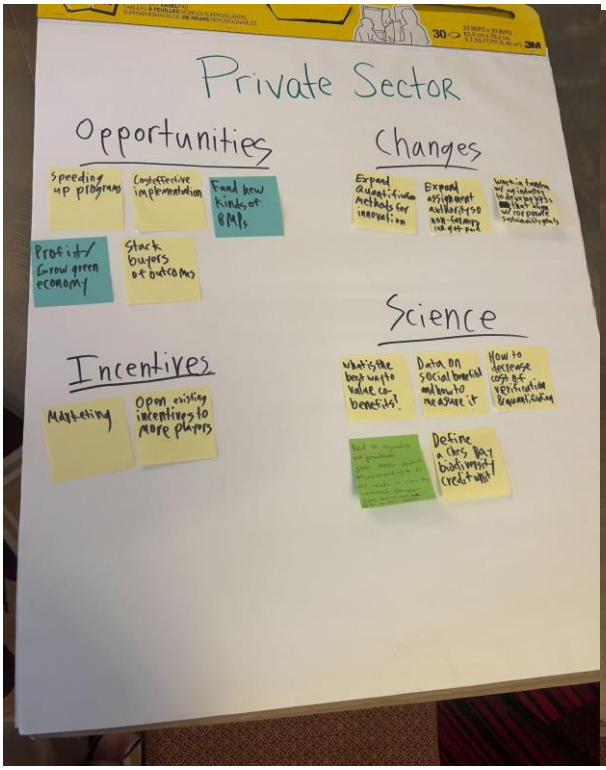
- "This project greatly impacted the water runoff from my farm due to better facilities, better water drainage, and better water control. The health improvement we have seen in our calves and heifers has been huge simply due to the new facilities and better environment that we now have. If the farmer does not get financial aid, many of these projects will not continue."
- - THCWP Supported Farmer

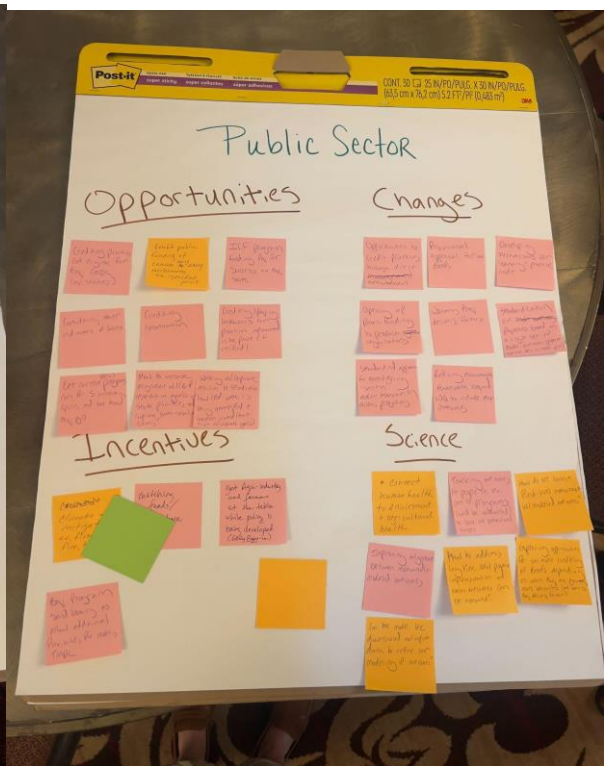
Appendix G: Roundtable - Responses and Images of Note Documents



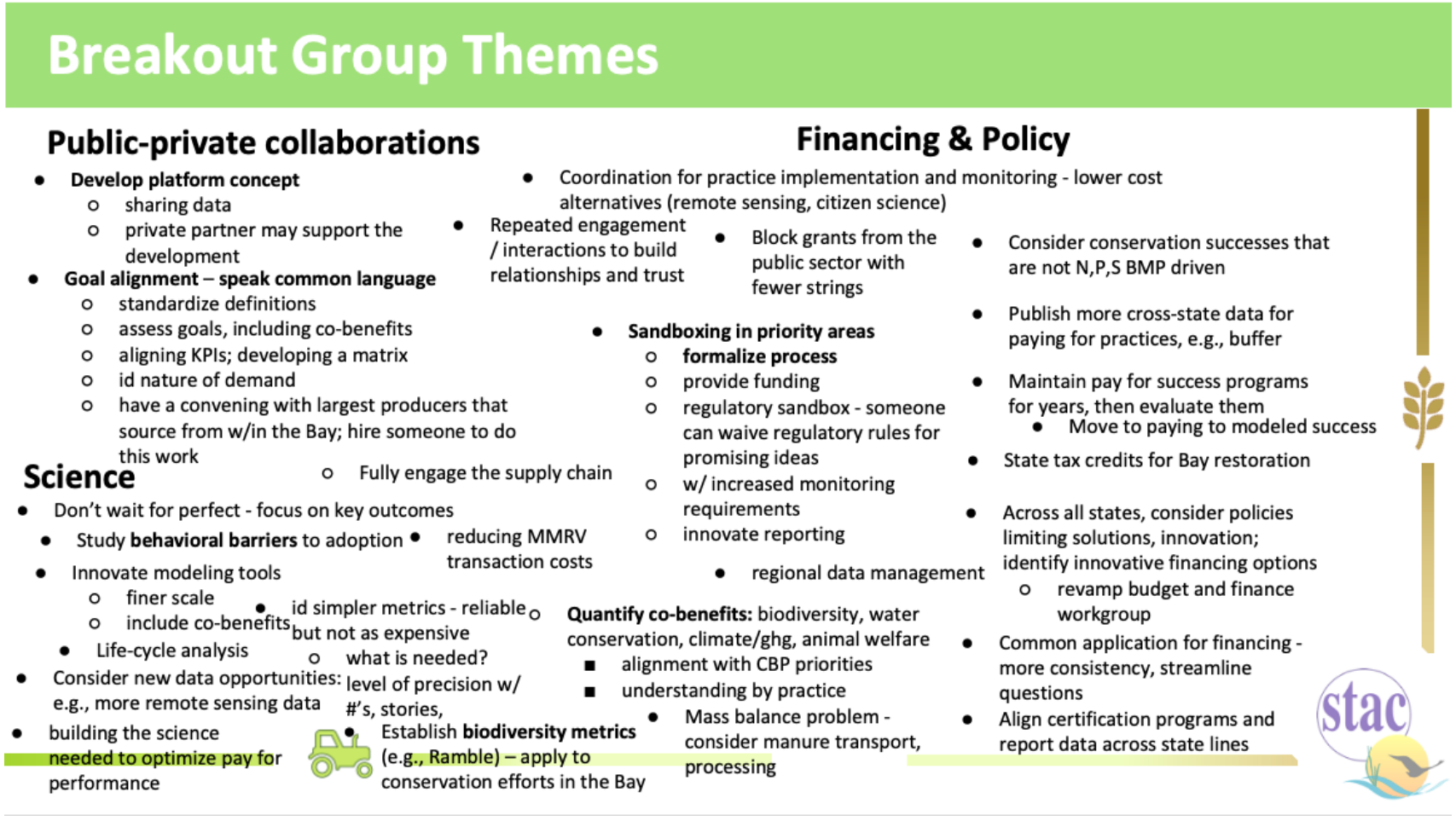

Metrics
Opportunities
Changes
Incentives
Science


Pay-for-Performance
Outcome-based Programs
Models
Opportunities
Changes
Incentives
Science

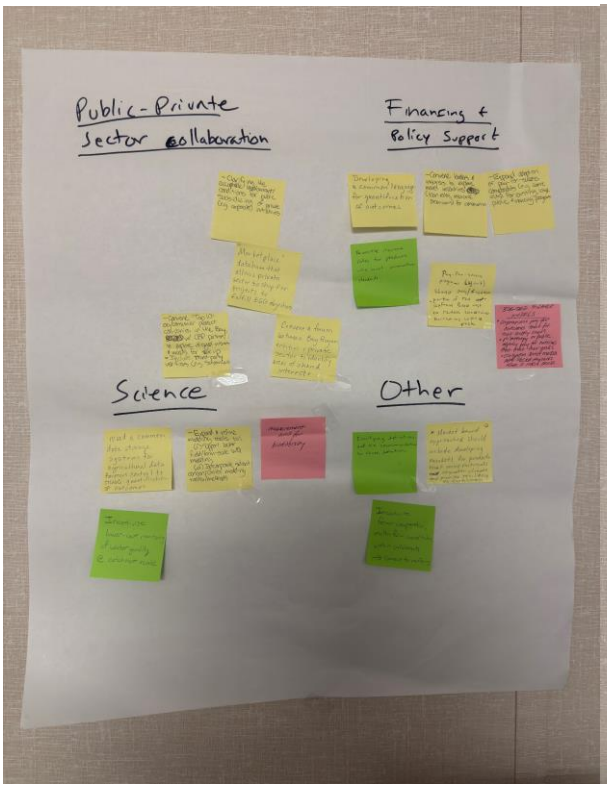

Private Sector
Opportunities
Changes
Science
Incentives
Marketing

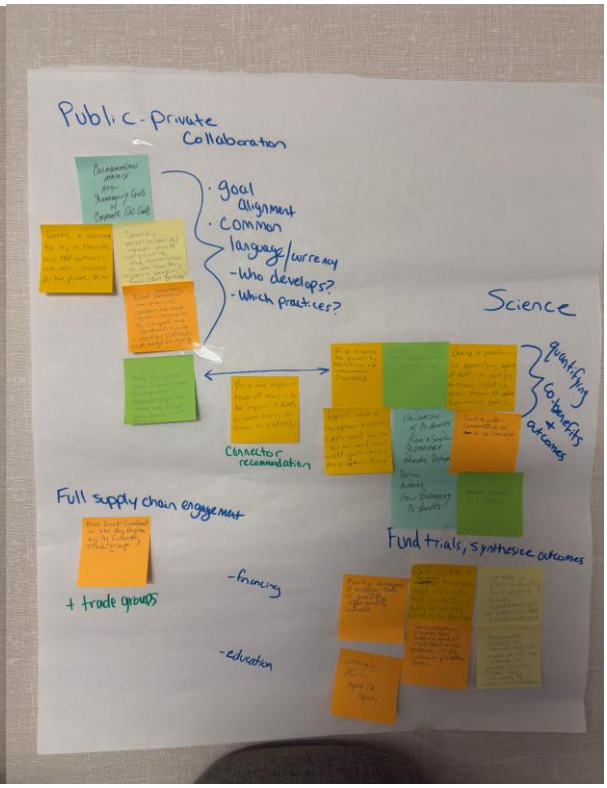

Public Sector
Opportunities
Changes
Incentives
Science

Appendix H: Breakout Discussion - Common Themes Slide



Appendix I: Breakout Discussions - Images of Note Documents






1. Weight Assigned to the Hurricane Ivan Sample
(t = 2004/09/20; Q = 15,400 m³/s; C = 3,680 mg/L)
Figure 2: Relative weight of all available samples as assigned in WRTDS for two dates (9/1/1990 & 9/1/2005) and two discharge values (200,000 & 400,000 cfs)
Financing + Policy
Policy assessment
better understand policy options
Policy / Finance
Group 3 Top Priorities
Science
Public - Private
Policy / Finance
Group 3 other priorities
Science
Public Private
Public-private collaboration
Financing + Policy
Science
Other