

Section 3

Goals, strategies, and actions

This section describes 6 goals, 14 strategies, and 27 actions to address risks and enhance agricultural resilience, guided by 5 overarching principles. Each action includes broad estimates of timeline and budget, select collaborators, effectiveness metrics, and select related existing tools and programs. For these actions to successfully enhance agricultural resilience in Washington state, significant funding and staff resources are required.



Principles

The principles below guided the development of the goals, strategies, and actions in the Climate Resilience Plan for Washington Agriculture. To the greatest extent possible, all climate actions presented in this plan:

- **Safeguard the vitality and viability** of Washington’s agricultural economy, heritage, culture, and communities in the face of climate change.
- **Promote co-benefits** including clean air and water, economic resilience, equity and environmental justice, GHG emissions reductions, soil health, and species and habitat protection.
- **Encompass diverse and collaborative approaches** including research, funding opportunities, technical assistance, policy support, outreach and education, and multi-benefit projects.
- **Ensure that information, support, and resources are available and accessible** to farm operators and workers of all regions, demographics, operation size, and primary spoken languages.
- **Incentivize voluntary participation in climate-resilience initiatives**

Goals, strategies, and actions summary



ACTIONS



GOAL 2

Support the adoption of climate-resilient agricultural practices

STRATEGY 2.1

Support research into on-farm strategies and actions that increase climate resilience in Washington

2.1.1: Establish a coordinated research agenda and funding pathway for the development of climate resilience data, strategies, and tools

2.1.2: Develop conservation practice monitoring tools

2.1.3: Encourage the development and implementation of climate-resilient technological innovation in Washington's agricultural sector

STRATEGY 2.2

Provide producers and farmworkers with education and technical assistance to mitigate the negative impacts of climate change and leverage opportunities

2.2.1: Increase institutional capacity for the provision of climate resilience research, outreach, and technical assistance across Washington

2.2.2: Develop or enhance a centralized source of information for agricultural climate-resilience in Washington

STRATEGY 2.3

Increase quantity and accessibility of funds for implementing on-farm climate resilience and recovery strategies

2.3.1: Work with stakeholders to reduce barriers in accessing funds for GHG emissions mitigation, climate change adaptation, and post-disaster recovery

2.3.2: Increase funding for producers and farmworkers to implement on-farm climate resilience and recovery actions

STRATEGY 2.4

Preserve agricultural land

2.4.1: Support and enhance strategies to protect agricultural land



GOAL 3

Safeguard a sufficient quantity of high-quality surface and groundwater for people, farms, and aquatic ecosystems

STRATEGY 3.1

WATER SUPPLY: Ensure sufficient quantity of water for farms, people, and aquatic ecosystems

3.1.1: Support water management efforts and ensure agricultural interests are represented

3.1.2: Support the adoption of on-farm water conservation technologies

STRATEGY 3.2

WATER SUPPLY: Ensure water quality programs also work towards climate resilience

3.2.1: Expand the goals of existing water quality programs to include resilience to ongoing climate change and extreme events



Figure 6. A graphical summary of the goals, strategies and actions in the Climate Resilience Plan for Washington Agriculture.

Goals, strategies, and actions

The goals, strategies, and actions in this section are described as follows:

WSDA's Role

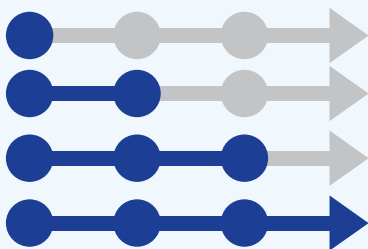
Describes whether WSDA leads and co-leads, convenes, or supports stakeholders in the implementation of the action.

Select collaborators:

Details select agencies and organizations that can play a key role in successful implementation. These collaborators are listed in addition to the farm operators, workers, policymakers, and agricultural stakeholders who are essential to the implementation of every action.

Implementation timeframe:

Describes if the action can begin in 1–2 years, 3–4 years, or is already in process.

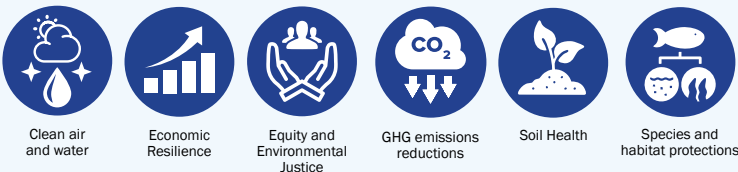


Cost:

Indicates the anticipated cost of implementation: least expensive (\$) under \$249,999; midrange (\$\$) from \$250,000–\$499,999; higher range (\$\$\$) from \$500,000–\$999,999; and highest cost (\$\$\$\$) over \$1 million.



Co-benefits:



Resilience metrics:

Suggests measures of progress for tracking what was done (implementation) and if actions increased resilience (effectiveness).

Select existing programs and tools:

Describes select WSDA and partner programs related to each action. While not comprehensive, these lists may be used to determine whether new programs or tools are required, or if existing resources can be expanded. In limited instances, programs and tools from other states have been included to inform WSDA efforts.

Goal 1: Increase agriculture's preparedness for, response to, and recovery from climate-related extreme events

Strategy 1.1. Improve data collection, communication, and resource provision for climate-related extreme event preparedness

Action 1.1.1. Enhance the availability, accuracy, and accessibility of weather data and early warning systems

Inform decision-making before, during, and after climate-related extreme events by enhancing the availability, accuracy, and accessibility of current, historical, and forecasted weather data and climate prediction models. Install new monitoring stations complementary to existing automated weather stations. Where possible, expand the environmental variables that each station records (e.g., air quality or GHG measurements). Ensure variables are recorded and summarized across networks in consistent units and timescales. Using the best available data and predictions, develop user-led decision support systems to inform field operations (e.g., storm predictions, frost warnings, heat advisories, air quality updates, soil moisture forecasts), and ensure they're widely available to producers, farmworkers, and rural communities through culturally inclusive communication, community outreach, early education programming, and in-person promotion.



Action 1.1.1. Details:

WSDA's Role		
Convene, support.		
Select collaborators:		
Conservation districts, ECY, EPA, Health, NWS and other NOAA programs, NRCS (USDA), WSU		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Deployment or upgrade of new or existing monitoring systems to integrate with existing weather station networks • The generation of geographically diverse data to update predictive models • The number of new decision support tools and early warning systems developed using climate data, along with the number of active users • Development and deployment of communication plans and early education curriculum to increase awareness and accessibility of tools and data Effectiveness: • End-user engagement • Increased accuracy of predictive models		
Select existing programs and tools:		
Community Collaborative Rain, Hail & Snow Network; Washington Drought Declaration (ECY); AirNow.gov air quality data (EPA); Agriculture Compliance Unit (L&I); National Ag Safety Database (National Institute for Occupational Safety and Health); Climate Prediction Center–Seasonal Outlook, Drought Early Warning System, Graphical Forecast for Washington, NWS Cold Advisory for Newborn Livestock, NWS Skywarn, Storm Prediction Service/Weather Prediction Service, wireless emergency alerts (NOAA); Agricultural Weather Highlights, Northwest Climate Hub, World Agricultural Outlook Board (USDA); climate-related data and forecasts (University of Washington, Department of Atmospheric and Climate Science); AgWeatherNet, Cattle Comfort Index, crop-specific cold hardiness models, Decision Aid System, Irrigation Scheduler, Worker Heat Awareness (WSU)		

Action 1.1.2. Increase preparedness for livestock sheltering and feeding during climate-related extreme events

Work with collaborators and stakeholders to identify gaps in livestock sheltering infrastructure and emergency feeding capacity, including temporary or contingency solutions for potential seasonal hazards. Catalog existing relief and recovery funding resources (grants, loans, and insurance) through a partnership with SCC, Extension (WSU), and FSA (USDA), and identify coverage gaps to inform emerging state investments or grant opportunities. Develop and maintain a publicly available searchable database of agriculture recovery programs for users to find available situation-based relief programs.

Action 1.1.2. Details:

WSDA's Role		
Support		
Select collaborators:		
Animal control agencies, commodity groups, conservation districts, county emergency management, county fairgrounds, Extension (WSU), industry, livestock nutrient management agencies, local jurisdictions, National Animal Rescue and Sheltering Coalition (National Animal Care & Control Association), non-profit animal organizations, SCC, and FSA (USDA).		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: Comprehensive online searchable database for livestock sheltering during extreme events		
Effectiveness: - Increased capacity to house livestock in safe locations during extreme weather events - Reduced livestock losses during extreme weather events - Database user engagement metrics		
Select existing programs and tools:		
Red Star Rescue (American Humane Association); National Field Response (American Society for the Prevention of Cruelty to Animals); Community Animal Rescue Teams; National Animal Rescue and Sheltering Coalition (National Animal Care & Control Association)		

Strategy 1.2. Mitigate agricultural impacts by enhancing tools, resources, and strategies for collective emergency response

Action 1.2.1. Enhance swift and collective response to climate-related extreme events

Identify and implement measures to minimize impacts on humans, the environment, food systems, and the agricultural sector during extreme weather events or outbreaks of pests or diseases. Develop and deploy culturally and linguistically tailored emergency response training programs for producers and farmworkers to address climate-related risks such as heat stress, wildfire smoke, and flooding. Minimize the time between incidents, stakeholder notification, and collective response by efficiently integrating Emergency Support Function (ESF) 11 activities into agricultural response and recovery efforts. Leverage communication and collaboration mechanisms during emergencies to provide timely and accurate information, guidance, and updates on food safety and agricultural and natural resource impacts and protections.

Action 1.2.1. Details:

WSDA's Role		
Lead, convene		
Select collaborators:		
Conservation districts, Extension (WSU), local jurisdictions, state agencies organized under ESF 11 including DNR, DSHS, ECY, EMD, Health, SCC, WDFW, NWS, and other NOAA programs		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Development and sharing of Essential Elements of Information (EEI). • Use of the Incident Command System (ICS) during extreme events by agricultural stakeholders • Development of agricultural damage assessment metrics Effectiveness: • Use of the Emergency Support Function (ESF) 11 framework to scale response actions • Incorporation of agriculture business and worker impacts into the state damage assessment process • Improved protection and restoration of agricultural and natural resources • Reduction in economic damage to agricultural production operations following climate-related extreme events		
Select existing programs and tools:		
National Response Framework and National Incident Management System (FEMA); Disaster Assistance Program, Washington Shrubsteppe Restoration and Resiliency Initiative (SCC); National Institute of Food and Agriculture Rapid Response Funding (USDA); Comprehensive Emergency Management Plan and Washington Restoration Framework (Washington Military Department); Emergency Support Function 11-Agriculture and Natural Resources (WSDA)		

Action 1.2.2. Expand and create a dedicated funding source for WSDA’s Emergency Food Security Resilience & Relief Program

Expand and establish a permanent funding pathway for emergency food security response, including 1) The ongoing state-driven procurement and management of emergency food reserves and 2) The strategic, transparent distribution of food and funding to enterprises and organizations deemed vital to emergency food security based on a set of stakeholder-informed criteria. Provide ongoing funding for emergency food reserves, from which the state can ensure rapid emergency food distribution to communities impacted by fire, flood, extreme heat, drought, and other climate and/or public health emergencies. Coordinate and establish procurement criteria and distribution priorities that reflect stakeholder values, as well as regional, dynamic emergency distribution plans, which may include emergency food relief for communities and Tribal governments under an emergency declaration; equipment support and financial relief for Washington farm and food businesses operating in or serving a community under a county, state, or federal emergency declaration; and assistance for food banks, food pantries, and meal programs (including child and senior nutrition programs). Regularly evaluate need, stakeholder engagement, consistent inventory and ongoing replenishment, emergency distribution planning, and ongoing distribution. Coordinate across a broad group of essential stakeholders.

Action 1.2.2. Details:

WSDA’s Role		
Lead		
Select collaborators:		
DSHS, EMD, Health, NGOs, philanthropy, policymakers, and producers		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Creation of a stakeholder advisory body to inform the program • Development of an inventory and replenishment system • Creation of an emergency distribution plan Effectiveness: • Number of days under a state of emergency without interruption to emergency food assistance • Volume of emergency food and water distributed within distressed communities during a declared state of emergency		
Select existing programs and tools:		
Commodity Supplemental Food Program; Emergency Food Assistance Program; Local Food Purchasing Assistance Cooperative Agreement Program (WSDA and USDA)		

Action 1.2.3. Establish working groups to develop tools, technology, and strategies for managing flooding and sea level rise

Create cross-agency working groups to investigate strategies and best practices to become more resilient to flooding and sea level rise. Focus investigations on drainage assessments and implementation of mitigation measures for high-value farmland in floodplains and inundation zones. Explore current and emerging site-specific options including water storage, streamflow optimization, wetland easements, managed retreat, infrastructure upgrades, and planting salt-adapted crops.

Action 1.2.3. Details:

WSDA's Role		
Co-lead, convene, support		
Select collaborators:		
Conservation districts, DNR, drainage districts, ECY, industry, irrigation districts, SCC, university partners		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Number of farms/acres with deployed mitigation strategies • Public and private investments in reducing flood and inundation impacts Effectiveness: • Reduced acres of inundated/flooded farmland during flooding events • Acres of riparian habitat easements adjacent to or directly benefiting high-value farmland from inundation/flooding • Reduction in economic damage to agricultural production operations following flooding event • Acres of at-risk farmland with reduced risk from intrusion		
Select existing programs and tools:		
Floodplains by Design, Shoreline Master Program (ECY); Watershed Programs of the NRCS (USDA); Nutrient Management Technical Services Program (WSDA)		

Strategy 1.3. Support timely and robust agricultural recovery from climate-related extreme events

For funding related to agricultural recovery, see also: Strategy 2.3 and related actions.

Action 1.3.1. Develop animal composting infrastructure that can accommodate offal from routine and catastrophic livestock deaths

Lead efforts to initiate, develop, plan, support, and incentivize a robust composting infrastructure to provide a viable, alternative disposal method for livestock animal mortalities and organic waste management. Conduct a market analysis for appropriate facility locations and regional needs. Build infrastructure and develop resources to support composting facilities that can routinely manage animal mortalities and offal, and scale up to support carcass management following extreme events. Provide economic incentives for producers and facility owners to deploy environmentally compliant composting management. Where appropriate, enhance support for on-farm mortality management through education, technical assistance, and funding.

Action 1.3.1. Details:

WSDA's Role		
Lead, convene		
Select collaborators:		
Animal agriculture sector, conservation districts, ECY, Health, local health districts, Extension (WSU), industry		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Completion of market analysis • Number of programs, resources, educational events, and incentives supporting composting facilities, livestock producers, and meat processors • Existence of streamlined laws, rules, and policies to facilitate animal composting Effectiveness: • Number of composting facilities routinely accepting animal carcasses • Ability of composters to scale up during extreme animal mortality events • GHG reductions from the appropriate disposal of animal carcasses • Reduced public safety and human health risks from the appropriate disposal of animal carcasses		
Select existing programs and tools:		
Organics Management Law (Washington State); Animal Health Program; Emergency Management Program; Nutrient Management Technical Services Program; Regional Markets Program (WSDA)		

Goal 2: Support the adoption of climate resilience agricultural practices

Strategy 2.1. Support research into on-farm strategies and actions that increase climate resilience in Washington

Action 2.1.1. Establish a coordinated research agenda and funding pathway for the development of climate resilience data, strategies, tools, and practices

Collaboratively create a research agenda to support the development of data-driven, climate-resilient practices and tools. Seek diverse development and implementation partners, particularly with farmers and farmworkers, to leverage local knowledge and expertise while ensuring solutions are practical and useable. Seek participation from Washington's many agricultural peer-to-peer networks. Coordinate across institutions to increase transparency and information sharing. Ensure that all generated data is accessible to agricultural stakeholders and leads to the development of useful decision support tools. Establish a permanent fund to support the execution of the research agenda. Research topics include, but are not limited to:

- Water supply and economic impact projections
- Disease, weed, and pest vector surveillance, prevention, response, and recovery
- Research and development of pest-resilient crops
- Selective breeding and variety trials for climate-resilient species
- Field trials and economic analysis of on-farm best management practices
- Waste management, industrial symbiosis, and biomass utilization
- Impact of practices on outcomes like water quality, animal welfare, farm profitability, soil health, biodiversity, and GHG emissions
- Research on agronomic and economic strategies to enhance the feasibility of practices
- Life cycle assessments for baseline GHG emissions data in different cropping systems
- Short- and long-term impacts of climate change on farmer and farmworker health



Action 2.1.1. Details:

WSDA's Role

Lead, convene, support

Select collaborators:

Animal agriculture sector, conservation districts, ECY, Health, local health districts, Extension (WSU), industry

Implementation timeframe:



Cost:



Co-benefits:



Resilience metrics:

Implementation:

- Development of Climate Resilience Research Agenda for Washington Agriculture
- Development of a permanent funding pathway to support the research agenda
- Dollars dedicated to agricultural resilience research
- Number of research projects and studies conducted
- Number and diversity of development and implementation partners
- Production of data to inform climate-resilience strategies and tools

Effectiveness:

- Creation and use of decision support tools for agricultural stakeholders
- Crop and aquaculture varieties bred with climate tolerances
- Producer perceptions of climate preparedness
- Creation and use of shared databases across agencies and university partners on topics including disease vectors, conservation practice adoption rates, and conservation practice impacts
- Improved preparedness and response to climate-related disasters, including diseases, pests, and extreme events
- Number of farms and acres, and diversity of farm size and demographics, adopting on-farm innovations, conservation practices, and technologies supported by science-based research
- Creation and use of climate-smart agricultural curriculum amongst producers and agricultural consultants
- Number of programs and partners incorporating the research agenda and its findings into decision-making processes, including the allocation of additional funds and resources

Select existing programs and tools:

Long-term agroecological research sites from the Washington Soil Health Initiative (SCC, WSDA, WSU); ARS, Conservation Innovation Grants, Sustainable Agricultural Systems Grants (USDA); Natural Resources and Agricultural Sciences, Nutrient Management Technical Services Program, Organic Program, Specialty Crop Block Grants (WSDA); Western Sustainable Agriculture Research and Education Grants

Action 2.1.2 Develop conservation practice monitoring tools

Develop tools to monitor and model conservation practice adoption and associated impacts on air and water quality, GHG emissions, soil health, and species and habitat protection. Use data integrated from surveys, remote sensing imagery, and projects funded by public institutions to establish a baseline of current conservation practice adoption, against which future progress can be measured.

Action 2.1.2. Details:

WSDA's Role		
Support		
Select collaborators:		
ECY, industry, Science Hub (SCC), NRCS (USDA), university partners		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Development of a tool to monitor the adoption of conservation practices		
Effectiveness: • Use of tool in decision-making processes at the state and federal level, including in decisions about where and how to focus additional dollars and efforts • Use of resulting data in the natural and working lands component of the Washington State GHG Inventory • Increased understanding of effective adaptation and mitigation interventions and practices		
Select existing programs and tools:		
Operational Tillage Information System tool (The Conservation Technology Information Center); ARS, ECY, Soil Carbon Monitoring and Research Network (USDA)		

Action 2.1.3. Encourage the development and implementation of climate resilience technological innovation in Washington state’s agricultural sector

Position Washington state as a leader in agricultural climate innovation through comprehensive, science-driven technology, research, and development. Where applicable, support the development, testing, and implementation of technologies, crop varieties, and management practices—such as on-farm energy production (e.g., biogas, agrivoltaics), virtual fencing, drought- and heat-resistant crop breeding, mechanical harvesting, industrial symbiosis, and precision management technologies—that could enhance agricultural resilience. Encourage collaborative research that involves farmers and farmworkers in identifying proactive climate-resilient strategies and tools. Seek innovative partnerships with the private sector to support operations of all sizes and demographics across the state.

Action 2.1.3. Details:

WSDA’s Role		
Convene, support		
Select collaborators:		
Commerce, conservation districts, farmworkers and their organizations, industry, NGOs, Pacific Northwest National Laboratory, ARS (USDA), university partners		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Research innovative climate adaptation technology and practices • Number of formal partnerships between diverse agricultural stakeholders, including between agricultural and tech industries, farmworker organizations, and research institutions Effectiveness: • Number of innovations that are scaled for widespread deployment • Effectiveness of the innovation in helping producers adapt to climate change • Affordability and accessibility of innovations to farm operators and workers of all regions, demographics, operation size, and primary spoken languages		
Select existing programs and tools:		
Industrial Symbiosis grants, programs, and services provided by the Office of Economic Development & Competitiveness (Commerce); Organics Management Law (Washington State); AgAid Institute (WSU)		

Strategy 2.2. Provide producers and farmworkers with education and technical assistance to mitigate the negative impacts of climate change and leverage opportunities

Action 2.2.1. Increase institutional capacity for the provision of climate resilience research, outreach, and technical assistance across Washington state’s diverse cropping systems and landscapes.

Build agricultural climate resilience support infrastructure, centrally coordinated by leadership at WSDA and WSU, with Extension practitioners in different production systems and regions across the state. Develop place- and context-based solutions to climate challenges in different production systems and regions, and build technical support infrastructure to broadly implement solutions on-farm. Support existing or new peer-to-peer networks for effective knowledge exchange and community building. Develop a funding pathway to add, at minimum, the following positions with regional climate resilience experts in Extension: veterinarian, engineer, agronomist, entomologist, agricultural climatologist, and agricultural economist. Centrally collect and equitably amplify all data, outreach materials, and decision support tools. Deploy creative professional development and retention strategies.

Action 2.2.1. Details:

WSDA's Role		
Co-lead		
Select collaborators:		
Agricultural consultants, farmworkers, conservation districts, industry, NRCS (USDA), WSU (Co-lead)		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Number of new technical support staff installed across the state • Number of crop and livestock systems represented by the expertise of hired staff • Number of producers engaged • Number of tools tested, adapted, and developed • Increase in the use of these tools Effectiveness • Adoption of climate resilience strategies by producers		
Select existing programs and tools:		
Conservation technical assistance and resources (conservation districts); Center for Technical Development (SCC); Washington Soil Health Initiative (SCC, WSDA, WSU); ARS and Northwest Climate Hub (USDA); Climate Analogs Academy, Extension (WSU)		

Action 2.2.2. Develop or enhance a centralized source of information for agricultural climate resilience in Washington state

Develop or collaboratively enhance a centralized website for information about agricultural climate change impacts, resilience strategies, and resources related to technical assistance, funding, and policy. Tailor information in multiple formats and languages for diverse agricultural stakeholders, including producers, farmworkers, industry, NGOs, and university partners. Include peer-reviewed articles about the science of climate change, as well as plain talk information about resilience strategies and actions. Compile new data and climate-resilient management practices resulting from the actions in the Climate Resilience Plan for Washington Agriculture, while highlighting existing resource hubs hosted by collaborators.

Action 2.2.2. Details:

WSDA's Role		
Lead, convene		
Select collaborators:		
Commerce, ECY, Science Hub (SCC), university partners, Northwest Climate Hub (USDA), Washington State Commodity Commissions		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Development or identification of a website to host research and resources • Completed communications strategy promoting the website Effectiveness: • Producer and agricultural stakeholder awareness of the website • Number of website visits and information downloads • Accuracy and timeliness of updates and website maintenance		
Select existing programs and tools:		
Regional Integrated Sciences and Assessments (NOAA); Washington Soil Health Initiative's resource website (SCC, WSDA, WSU); Northwest Climate Hub (USDA); Northwest Climate Resilience Collaborative (University of Washington); Extension (WSU)		

Strategy 2.3. Increase quantity and accessibility of funds for implementing on-farm climate resilience and recovery strategies

Action 2.3.1. Work with stakeholders to reduce barriers to accessing funds for GHG emissions mitigation, climate change adaptation, and post-disaster recovery

Address documented concerns regarding the difficulty of accessing funds due to the administrative burden in applying and reporting, matching requirements, reimbursement periods, and inflexible practice specifications not suited for diverse operations. Remove administrative barriers to funding programs and make them easier for producers and farmworkers to access. Work with funders, lenders, and insurance companies to understand and remove the challenges of accessing funds. Promote flexible, easy-to-access financial assistance for climate-resilient agricultural technologies and practices, infrastructure improvements, regulatory compliance, and disaster relief. Enhance the consistency of access for operations of all sizes, demographics, and primary spoken language. Support agricultural viability at all scales, including operations owned or managed by overburdened populations and on federally recognized Tribal lands. Tailor programs to support participation by small and lower-income operations, farmworkers, and tenant farmers. Seek innovative public/private partnerships, including ones with agricultural finance institutions and supply chain partners. Work with diverse funders to conduct an audit and streamline processes where possible. Identify and fund organizations to provide grant writing, application assistance, and case management to diverse farm communities.

Action 2.3.1. Details:

WSDA's Role		
Convene, support		
Select collaborators:		
Agricultural finance institutions including lenders and insurers, farm advocacy NGOs, federal, state, and local funders, industry, university partners		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Number and diversity of funders working together to reduce barriers • Number of funding programs audited and streamlined Effectiveness: • Reduced application time • Increased number of applications received • Increased number of small-scale and underrepresented farmers applying for funding • Reduced wait time for payments or reimbursements • Measure applicant satisfaction by surveys and stakeholder engagement		
Select existing programs and tools:		
Federal Funds Grant Writing Assistance Program (Commerce); Disaster Assistance Program (SCC); disaster assistance grants and programs from FSA, NRCS, and Rural Development (USDA)		

Action 2.3.2. Increase funding for producers and farmworkers to implement on-farm climate resilience and recovery actions

Create new or expand existing funding sources to make agriculture more resilient to long-term climate changes and climate-related extreme events, including for on-farm investments and farmworker housing. Reduce the financial burden on private landowners to provide public benefits (e.g., soil health, carbon sequestration, species and habitat protection, open space, and food security). Increase the quantity and accessibility of relief funds available to producers and farmworkers impacted by climate-related disasters. Collaborate with other state grant and loan programs to fund a wide range of on-farm climate-resilience and recovery activities for extreme events and long-term climate change, including but not limited to:

- Preparedness for, response to, and recovery from climate-related extreme events
- Infrastructure investments
- Climate-smart equipment and technology
- Conservation practice implementation including labor, equipment, and amendment costs
- Preservation of agricultural lands at risk of development or loss due to climate-related events
- On-farm water conservation technologies and off-farm water infrastructure
- Workforce safety programs that eliminate or reduce climate-related hazards and provide adequate training to all relevant agricultural stakeholders
- Research, modeling, incentives, policy support, outreach, and technical assistance for early detection and response to pests, weeds, and disease



Action 2.3.2. Details:

WSDA's Role

Lead, support

Select collaborators:

Agricultural finance institutions including lenders and insurers, Commerce, farmworkers, industry, L&I, SCC, NRCS (USDA), university partners

Implementation timeframe:



Cost:



Co-benefits:



Resilience metrics:

Implementation:

- Number of projects funded
- Number and diversity of participating farms measured by demographic information, farm size, operation type, and region

Effectiveness:

- Number of conservation and climate-resilience investments funded, return on investment, change in productivity, water conservation, and other desired outcomes
- Reduced loss of livestock, crops, buildings, infrastructure, and other investments during extreme events

Select existing programs and tools:

Disaster Assistance Program, Irrigation Efficiencies Grant Program, Office of Farmland Preservation, Sustainable Farms and Fields, and other funding programs (SCC); Washington State Organic & Sustainable Farming Fund (Tilth Alliance); Conservation Reserve Program, EQIP, and other NRCS programs (USDA); Compost Reimbursement Program, Organic Program, Saving Tomorrow's Agriculture Resources, Specialty Crop Block Grant Program (WSDA); Restore Grants (Zero Foodprint)

Strategy 2.4. Preserve agricultural land

Action 2.4.1. Support and enhance strategies to protect agricultural land

Maintain the cultural, social, economic, environmental, and resilience benefits provided by Washington farms by preserving agricultural land at risk of development or loss due to various factors, including climate-related risks and hazards. Assess the role WSDA can play in supporting and expanding current preservation, zoning, and succession planning efforts. Participate in policy discussions and working groups to explore options for expanding the purchase of conservation easements, securing grants, and leveraging additional tax funds to conserve high-priority farmland.

Action 2.4.1. Details:

WSDA's Role		
Support		
Select collaborators:		
Conservation districts, Land Trust Alliance, local land trusts, NGOs including American Farmland Trust, Office of Farmland Preservation (SCC), NRCS Recreation and Conservation Office (USDA), Washington Association of Land Trusts		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • WSDA representation in workgroups and policy discussions • Number and visibility of initiatives aimed at conserving farmland • Number of counties in compliance with the Growth Management Act through successful participation in the Voluntary Stewardship Program Effectiveness: • Number of agricultural acres kept in production • Number of acres permanently protected for agricultural use • GHG emissions reductions achieved through avoided conversion		
Select existing programs and tools:		
Research and advocacy programs (American Farmland Trust); Employee Ownership Program (Commerce); Conservation Futures, transfer or purchase of development rights programs (select Washington counties); Office of Farmland Preservation's Farmland Protection and Land Access Program, Voluntary Stewardship Program (SCC); NASS data, NRCS Agricultural Conservation Easement and Regional Conservation Partnership Programs (USDA); Growth Management Act (Washington State), Farmland Protection and Affordability Investment Program (Washington State Housing Finance Commission); Farmland Preservation-Washington Wildlife and Recreation Program (Washington State Recreation and Conservation Office)		

Goal 3: Safeguard a sufficient quantity of high quality surface and groundwater for people, farms, and aquatic ecosystems

Strategy 3.1. Water supply: ensure sufficient quantity of water for farms, people, and aquatic ecosystems

Action 3.1.1. Support water management efforts and ensure agricultural interests are represented

Support collaborative policy development and planning related to watershed management strategies in Washington state, including water supply and irrigation infrastructure development and modernization programs. Participate in coordinated discussions with stakeholders representing competing water interests to optimize public benefits and achieve collaborative, solution-oriented progress. Actively seek a participatory role in water management efforts, and work with stakeholders to ensure agricultural interests are included in watershed planning efforts.

Action 3.1.1. Details:

WSDA's Role		
Support		
Select collaborators:		
Conservation districts, ECY, irrigation districts, SCC, Tribal governments and organizations, US Bureau of Reclamation		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • WSDA representation in state and regional water management discussions • Number of enhanced water storage and irrigation infrastructure projects completed, with an emphasis on multi-benefit projects • Number of collaborative watershed management strategies involving agriculture, Tribes, and other stakeholders Effectiveness: • Establishment of multi-benefit watershed management programs in regions with known water supply vulnerabilities • Identification and prioritization of infrastructure enhancements that reduce economic and ecological impacts resulting from water supply shortages		
Select existing programs and tools:		
Columbia Basin Policy Advisory Group (ECY); Columbia Basin Restoration Initiative; Walla Walla Basin Watershed Planning Strategy and contributing partners; Drought Assessment Tool (WSDA); Yakima Basin Integrated Plan and contributing partners		

Action 3.1.2. Support the adoption of on-farm water conservation technologies

See also: Strategy 2.3 and related actions.

Fund research and practice implementation for on-farm water use efficiency, including current and emerging technologies and practices such as soil moisture monitoring, efficient water delivery systems (e.g. drip irrigation), on-farm water storage, conservation practices that increase soil water storage, and aquifer recharge where appropriate for the production system and geography. Improve understanding of system-level impacts of such strategies, both when used singly and in combination.

Action 3.1.2. Details:

WSDA's Role		
Support		
Select collaborators:		
Conservation districts, ECY, irrigation districts, SCC, Tribal governments and organizations, US Bureau of Reclamation		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: - Number of acres implementing efficiency measures Effectiveness: - Decreased depth to groundwater in aquifers - Reduction in water applied per crop produced - Reduced water and nutrient loss through deep percolation - Reduction in hydrologic impacts (groundwater declines, instream flow) associated with agricultural water use		
Select existing programs and tools:		
Drought Response Program (ECY); Irrigation Efficiencies Grant Program (SCC); NRCS EQIP WaterSMART Initiative (USDA)		

Strategy 3.2. Water quality: Ensure water quality programs also work towards climate resilience

Action 3.2.1. Expand the goals of existing water quality programs to include resilience to ongoing climate change and extreme events

See also Strategy 2.1 and Action 2.1.1.

Adapt WSDA's existing water quality programs to address the risk of extreme events, including increased precipitation that may increase off-target movement of pollutants, and drought that may concentrate pollutants in streams and rivers. Provide data, technical assistance, and funding opportunities to safeguard water quality during these events and throughout ongoing climate change. Communicate with producers about best management practices for mitigating the impacts of climate change on water quality issues.

Action 3.2.1. Details:

WSDA's Role		
Lead		
Select collaborators:		
Conservation districts, DNR, ECY, Health, industry, irrigation districts, local jurisdictions		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: - Integration of climate information into water quality monitoring protocols and technical assistance programs - Number and diversity of agricultural stakeholders attending presentations on water quality and climate impacts Effectiveness: - Reduced pollutants in Washington's surface and groundwater		
Select existing programs and tools:		
River and Stream Water Quality Monitoring Program (ECY); Office of Drinking Water (Health); Voluntary Stewardship Program (SCC); National Water Quality Assessment Project (US Geological Survey); Nutrient Management Technical Services Program, Organic Program, Pesticide Usage and Stewardship Programs, Surface and Groundwater Monitoring Programs (WSDA)		

Goal 4: Prepare the agricultural workforce for a changing climate

Strategy 4.1: Facilitate comprehensive farmworker protections from climate-related hazards

Action 4.1.1. Support the development of and compliance with farmworker protections through collaborative policy, program, and outreach efforts

Support efforts to improve farmworker health and safety from heat, outdoor air quality, and other climate-related hazards. Support increased access to shade structures, cooling stations, and cool potable water in fields to mitigate heat stress risks. Ensure diverse agricultural interests, including NGOs that specialize in farmworker rights and health, are represented during the development and deployment of new rules and programs to ensure inclusive policy recommendations. Harmonize regulations across agencies for efficient implementation and increased compliance. Aggregate information into a single resource. Communicate consistent information to all stakeholders. Establish transparent communication channels between government agencies, farmers, and workers. Establish a farmworker advisory board to collaborate with producers and policymakers. Develop simplified, multilingual resources and proactively distribute to build trust and understanding.



Action 4.1.1. Details:

WSDA's Role

Convene, support

Select collaborators:

Farmers, farmworkers and their organizations, Health, industry, L&I, NGOs, university partners

Implementation timeframe:



Cost:



Co-benefits:



Resilience metrics:

Implementation:

- Number and diversity of agricultural stakeholders represented in advisory groups for new health and safety regulations related to heat, air quality, and climate risks
- Awareness and use of existing and new aggregated information resources for all regulations and programs related to farmworker protections
- Increased understanding of laws and compliance strategies
- Percentage of farm operators and owners implementing and adhering to new health and safety regulations related to heat, air quality, and climate risks

Effectiveness:

- Improved health outcomes (lower incidence of heat stroke, asthma, heat-related illness, hospitalizations, or deaths) for farmworkers
- Reduction in workers' compensation claims related to heat exposure, respiratory issues, or other climate-related health conditions due to increased compliance

Select existing programs and tools:

Farmworker Justice; Office of Regulatory Innovation & Assistance (Governor's Office); Federal Migrant Health Program, Pesticide Illness Monitoring and Prevention Program, Temporary Migrant and Farmworker Housing (Health); Agriculture Compliance Unit, Consultation Program, Safety & Health Assessment & Research for Prevention, Wildfire Smoke Exposure Symptom Response Program, and other worker safety programs (L&I); Legal and Healthcare Services (Northwest Justice Project); Pacific Northwest Agricultural Safety and Health Center (University of Washington); Worker Protection Standards Program (WSDA)

Action 4.1.2. Support improved data collection, availability, analysis, and use of climate-related health impacts on farmers, farmworkers, and rural communities

Improve data collection on climate-related health incidents by occupation, both to regulatory agencies and medical institutions. Foster collaboration across agricultural, governmental, and medical institutions to collect occupational and environmental data during patient visits to health clinics. Establish baseline conditions against which to measure compliance and progress. Inform current and future policy development with comprehensive and accurate data. Use data to further identify predictors of injury and illness and develop mitigation opportunities.

Action 4.1.2. Details:

WSDA's Role		
Support		
Select collaborators:		
Farmers, farmworkers and their organizations, Health, industry, L&I, medical institutions, NGOs, university partners		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: - Increased data collection and availability Effectiveness: - Use of data to update or improve policy development and implementation, and training and education initiatives - Use of data to proactively identify and establish mitigation strategies		
Select existing programs and tools:		
Safety & Health Assessment & Research for Prevention, Wildfire Smoke Exposure Symptom Response Program, and other worker safety programs (L&I); Pacific Northwest Agricultural Safety and Health Center (University of Washington)		

Action 4.1.3. Support the development of a statewide farmworker safety communication network

Develop a statewide safety notification system for farm operators and farmworkers to minimize the time between health and safety threats from extreme weather and related mitigation actions. Ensure ease of access by developing multilingual communications distributed through diverse, culturally inclusive media channels including social media, text messages, listservs, and radio bulletins. Increase efficiency and ease of compliance by supporting technological solutions such as push app cell phone notifications tied to local weather stations to automatically alert farmers and workers of air quality and heat hazards.

Action 4.1.3. Details:

WSDA's Role		
Support		
Select collaborators:		
Farmworkers and their organizations, Health, L&I		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Number or percentage of farm operators and farmworkers enrolled in communication networks • Extent of network's geographic coverage Effectiveness: • Farmworker engagement with the system and user feedback • Improved health outcomes (lower incidence of heat stroke, asthma, heat-related illness, hospitalizations, or deaths) for farmworkers • Reduction in the number of compensation claims related to heat exposure, respiratory issues, or other climate-related health conditions		
Select existing programs and tools:		
AirNow.gov air quality data (EPA); Heat Safety Tool (Occupational Safety and Health Administration); Wildfire Smoke Text Alert System (Ventura County, California); AgWeatherNet's Worker Heat Awareness (WSU)		

Strategy 4.2: Train, maintain, and diversify an agricultural workforce equipped with the skills and knowledge to promote resilience practices and technologies

Action 4.2.1. Expand and fund agricultural workforce training programs to include climate-resilience curriculum

Address historic agricultural workforce challenges—worsened by climate change impacts—by developing a permanent funding pathway for local agricultural workforce development programs. Finance existing organizations and initiatives related to agricultural climate-resilience career paths, including green job development, agricultural technology training (e.g., precision agriculture, conservation agronomy), workforce diversification, rural job security, and agricultural leadership training. Develop and promote an early education curriculum for climate-resilience in agricultural communities. Develop initiatives to re-train farmworkers who may be displaced by automation, enabling them to transition to other roles within the agricultural sector.

Action 4.2.1. Details:

WSDA's Role		
Lead, support		
Select collaborators:		
Community and technical colleges, farmworkers and their organizations, university partners, Washington State Board for Community and Technical Colleges Centers of Excellence		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Number of program graduates • Number of employers participating in programs • Existence of early education curriculum Effectiveness: • Program evaluation surveys • Existence of an agricultural workforce trained and skilled in climate-resilience		
Select existing programs and tools:		
Homegrown by Heroes (Farmer Veteran Coalition); Future Farmers of America programs (local and national FFA); Minorities in Agriculture, Natural Resources, and Related Sciences (MANNRS); Center for Rural Affairs, Farm to School Program, Start2Farm, Support for Beginning Farmers (USDA); Office of Apprenticeship (US Department of Labor); 4-H, Agricultural Leadership Program (WSDA); Climate Analogs Academy (WSU)		

Action 4.2.2. Support farmworker engagement in climate resilience by leveraging their expertise and investing in continued professional development

Facilitate farmworker involvement in developing climate-resilience strategies and tools, ensuring that solutions are practical and worker-centered. Provide training opportunities and leadership development, particularly for crew supervisors, to foster a culture of safety and engagement. Support farmworker peer-to-peer networks for knowledge exchange, leadership development, and enhanced resilience.

Action 4.2.2. Details:

WSDA's Role		
Support		
Select collaborators:		
Community and technical colleges, farmworkers and their organizations, university partners, Washington State Board for Community and Technical Colleges Centers of Excellence		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Farmworker participation in the development of climate research, technology, and funding • The existence and use of farmworker advisory groups for climate-related innovation, program development, and rulemaking • Participants in leadership development programs Effectiveness: • Farmworker perceptions of team culture, safety, and engagement • Number of farmworker-led innovations supported and implemented		
Select existing programs and tools:		
Innovation Challenge (Semillero de Ideas), Pacific Northwest Agricultural Safety and Health Center (University of Washington), Agricultural Leadership Program (WSDA)		

Goal 5: Minimize impacts from pests, weeds, and disease

Strategy 5.1. Increase preparedness for emerging pests, weeds, and disease

Action 5.1.1. Develop and expand resources for the early detection of pests, weeds, and disease

Develop and expand permanent funding pathways for increased preparedness to existing and emerging pests, weeds, diseases, and harmful algal blooms. Finance research, modeling, incentives, policy support, outreach, and technical assistance specific to agricultural threat preparedness. Participate in cross-agency threat surveillance through the development and use of a shared database for environment-to-animal-to-human disease transmission. Develop tools that allow farmworkers to participate in pest identification, reporting, and threat mitigation. Ensure data and resources are available and accessible to broad agricultural interests.

Action 5.1.1. Details:

WSDA's Role		
Lead, support		
Select collaborators:		
ECY, Health, Animal and Plant Inspection Service (USDA-APHIS), university partners, WDFW, Washington State Commodity Commissions, Washington Invasive Species Council (Washington State Recreation and Conservation Office)		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Amount of secured funding • Number of incentives funded • Number of predictive models providing information on threats to Washington's diverse agricultural operations • Existence of shared surveillance database Effectiveness: • Reduced time to identify and respond to emerging threats • Containment of pests, weeds, and disease • Reduced agricultural losses due to pests, weeds, and disease		
Select existing programs and tools:		
Washington and Global One Health Collaboratives (Health and partner agencies); U.S. Climate Resilience Toolkit (NOAA); Northwest Regional Invasive Species and Climate Change; State Noxious Weed Control Board (Washington State); Animal Disease Traceability Program, Animal Health Program, Avian Health Program, Pest Program (WSDA); Decision Aid System, Pacific Northwest Herbicide Resistance Initiative (WSU)		

Action 5.1.2. Educate producers and farmworkers on emerging pests, weeds, and diseases

Educate agricultural stakeholders on the identification of emerging pests, weeds, and diseases, including the importance of early detection in reducing the economic impacts on Washington state's agricultural economy. Promote best management practices for the effective response to emerging pests, weeds, and diseases for leading commodities.

Action 5.1.2. Details:

WSDA's Role		
Lead		
Select collaborators:		
Agronomists and their organizations, Extension (WSU), industry, Washington State Commodity Commissions		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Number of outreach programs • Number of emerging pests, weeds, and diseases covered Effectiveness: • Quantification of pest/weed/disease-specific economic damages		
Select existing programs and tools:		
PNW Herbicide Resistance Initiative; Plant Protection Division (WSDA); Extension (WSU)		

Strategy 5.2. Improve and expand the response to emerging pests, weeds, and diseases

Action 5.2.1. Develop and expand communications and reporting networks for the rapid response to pests, weeds, and disease threats

See also Action 1.2.1 and Action 2.1.1.

Expand and develop communications networks related to new and emerging pests, weeds, and disease outbreaks, to support a rapid and coordinated multiagency and multijurisdictional response. Ensure diverse commodity groups, trade partners, and agricultural stakeholders are represented in the network.

Action 5.2.1. Details:

WSDA's Role		
Lead, convene		
Select collaborators:		
Washington State Commodity Commissions, Washington State Noxious Weed Control Board, Washington Invasive Species Council (Washington State Recreation and Conservation Office), Extension (WSU)		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Development of a multijurisdictional reporting and tracking system Effectiveness: • Measured response time between outbreak and response		
Select existing programs and tools:		
National Incident Management System (FEMA); Northwest Regional Invasive Species and Climate Change Network; PNW Herbicide Resistance Initiative; Incident Command System (USDA)		

Goal 6. Ensure that laws, policies, and regulations efficiently work towards the dual outcomes of climate-resilience and agricultural viability

Strategy 6.1. Enhance the development of and compliance with environmental and climate-related laws, policies, and regulations

Action 6.1.1. Convene stakeholders to explore the development of coordinated and efficient regulations that reduce administrative and financial burden while enhancing climate resilience, worker safety, and other co-benefits

Work across state agencies and stakeholder groups to explore, develop, and support efficient, harmonized regulations that simultaneously support public benefits, worker safety, climate-resilience, and agricultural viability. Develop new thinking and models of success in this arena, especially in developing and implementing strategies that increase compliance while securing farm productivity, profits, and worker earnings. Evaluate permitting and regulatory processes for the inclusion of climate-resilience. Actively seek a participatory role in the development of climate policies and rulemaking, and work with agricultural stakeholders to ensure diverse agricultural interests are included.

Action 6.1.1. Details:

WSDA's Role		
Lead, support, convene		
Select collaborators:		
Washington State Commodity Commissions, Washington State Noxious Weed Control Board, Washington Invasive Species Council (Washington State Recreation and Conservation Office), Extension (WSU)		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Number of legislative or other policy efforts on which WSDA and diverse agricultural stakeholders provide input • Number of permitting and regulatory processes evaluated and updated Effectiveness: • Successful inclusion of climate-resilient agriculture into legislation, policy, and regulatory activities • Reduced discrepancies between laws, policies, and regulations across state agencies		
Select existing programs and tools:		
Existing collaborative workgroups such as Environmental Justice Council, Food Policy Council, and Riparian Roundtable can inform the development of future collaborative efforts.		

Action 6.1.2. Support producers in achieving and maintaining environmental and climate-related regulatory compliance

Provide technical assistance, research, and funding to producers and farmworkers to support the efficient navigation of and compliance with environmental and climate-related regulations. Collaborate with agricultural stakeholders to collect and amplify best practices or effective mechanisms for maintaining compliance, including through peer-to-peer networks. Coordinate across different Washington cropping systems and geographies to share challenges, solutions, and best management practices.

Action 6.1.2. Details:

WSDA's Role		
Lead, support, convene		
Select collaborators:		
ECY, Extension (WSU), Washington State Commodity Commissions		
Implementation timeframe:	Cost:	Co-benefits:
		
Resilience metrics:		
Implementation: • Staff hired to provide support • Funding dedicated to pay for implementation support Effectiveness: • Number of operations in compliance		
Select existing programs and tools:		
Office of Regulatory Innovation & Assistance (Governor's Office); Natural Resources and Agricultural Sciences Program, Nutrient Management Technical Services Program, policy team and staff (WSDA); Extension (WSU)		