Sustainable Outcomes in Agriculture

A standard developed by Syngenta Sustainable Solutions for measuring continuous improvement towards sustainable outcomes on farms.

Version 1.3

Contents

About Syngenta

The purpose of Syngenta is to bring plant potential to life. We invest and innovate to transform the way crops are grown and protected to bring about positive, lasting change in agriculture.

Syngenta accelerates innovation to help meet the challenges of a changing world, from climate change, soil erosion and biodiversity loss to the demands of farmers and the wider society. Our innovation is enabling regenerative agriculture.

Realizing our contribution is a combined effort. We have a rich network of productive alliances with academic institutions, the food value chain and agricultural businesses, NGOs and farmers. Our open, collaborative culture makes us a sought-after partner.

Under the new Good Growth Plan, Syngenta is accelerating our innovation to provide solutions for farmers. Our target is to invest $2bn in sustainable agriculture breakthroughs by 2025 and to deliver two sustainable technology breakthroughs each year.

We will also strive for carbon neutral agriculture, both on farms and in our operations. We remain committed to enhance biodiversity and soil health on 3 million hectares of rural land every year, which we will do by providing technologies, services, and training to farmers.

Alongside this, we are reinforcing our commitment to help people stay safe and healthy by training 8 million farm workers on safe use every year and striving for fair labor across our entire supply chain.

We can only achieve our ambitious targets in partnership and in open dialogue about the value of agriculture innovation for farmers, nature and society, supported by strong Board level governance of sustainability.

1. Overview

The Sustainable Outcomes in Agriculture Standard (also referred to as the Standard) provides a framework to help agricultural supply chain companies and crop producers improve outcomes in regenerative agriculture. Performance in the Standard is a measurement of producer leadership in accomplishing sustainable outcomes in the production of their crops.

The Standard provides a structured methodology to select relevant sustainable outcomes and drivers of these outcomes from which a corresponding producer self-assessment is generated to assess their leadership. Leadership performance is scored, and individual producer scores are benchmarked against an aggregate for the region. Gaps in performance are linked to opportunities for on-farm improvements, customized for each participating producer, based on their unique data. The focus is on engaging producers in continuous improvement through the adoption of new, relevant practices and technologies to improve their leadership in delivering sustainable outcomes. The Standard offers a verification option for situations

where value chain actors in the supply chain want to assign sustainability attributes or claims to volumes of crop ingredients or agricultural raw materials.

Purpose? The purpose of the Standard is to establish a scientifically meaningful, actionable, and consistent approach to measure and promote progress in delivering improvements in outcomes for regenerative agriculture at scale.

What? The Standard is a holistic farm level assessment aimed at driving positive impact. It applies to all types of agricultural producers regardless of the operation size or geographic location.

The Standard connects producers to opportunities for improvements through a comprehensive range of opportunities for management practices such as precision agriculture, nutrient, and pest management relevant to delivering sustainable outcomes in regenerative agriculture. Outcomes include optimal production of crops, soil health, water impact, biodiversity, human and animal health and community leadership.

Why? The Standard was developed for crop production operations to provide a scalable and easy on-ramp for a wide array of producers and supply chain actors to engage in improving on-farm sustainability regardless of their stage of maturity in evaluating sustainability in their supply chains. Recognizing that not all producers are at the same level of performance in delivering sustainable outcomes on their farm, Leadership Performance Levels are included in the Standard to differentiate producers and connect each producer to relevant opportunities for continuous improvement.

How? The concept for the outcomes framework within the Standard originated in a solution created by The Sustainability Consortium for the measurement of Responsible Pest Management in cropping systems that integrates Integrated Pest Management (IPM) and Regenerative Agriculture principles and strategies.

The solution, which was developed through a diverse stakeholder process, embraces desired outcomes for pest management while recognizing the importance of differentiating producer leadership levels in attaining these outcomes. Each outcome is associated with tangible management strategies and practices implemented in pest management that are fully aligned to regenerative agriculture.

The Standard applies this basic concept to broader and more holistic outcomes in regenerative agriculture on the farm while responding to consistent feedback from producers for more easily understood and actionable information relevant to continuous improvement. Implementation of the Standard is supported by a suite of tools to support collaboration between partners in the value chain and producers in their supply chains to bring forth positive and sustainable change.

2. Theory of Change for Continuous Improvement

2.1. What is Being Evaluated

The goal is to drive the implementation of improvements in sustainable outcomes associated with crop production systems. For outcomes to be sustainable, they must not only be inclusive of

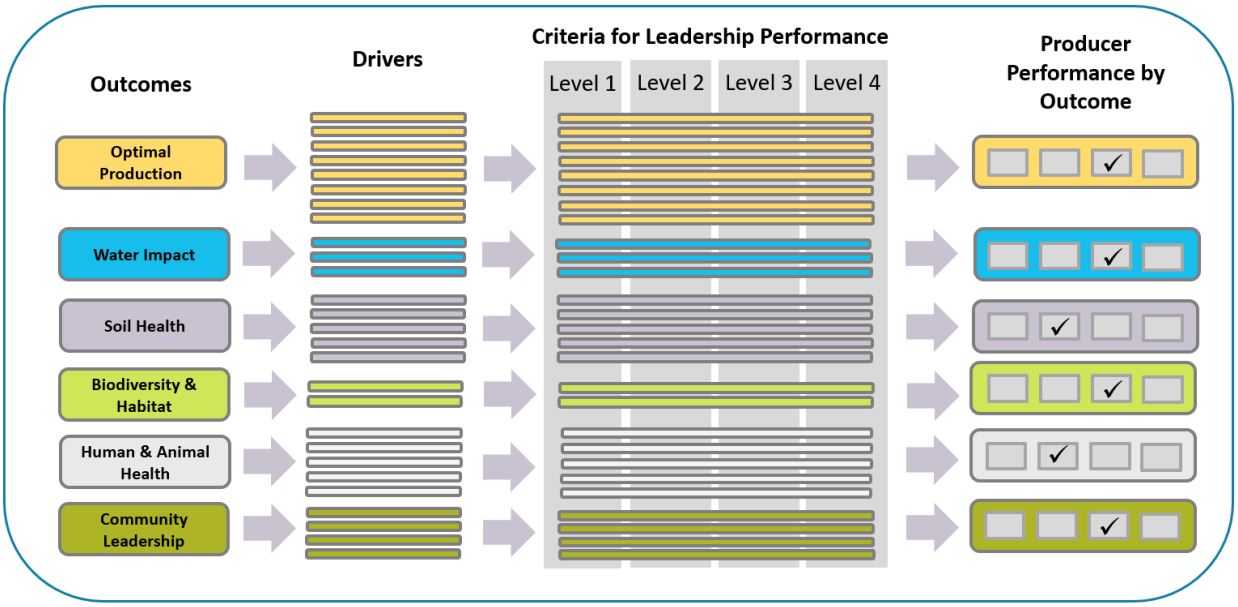
efficiencies and protecting natural resources but include holistic ways of farming that foster the natural systems and their processes to improve and enhance overall resilience of the system including vitality of soils and biological activity. This, in turn, will not only mitigate risks from climate impact but in the long-term improve crop productivity with less reliance on additional inputs and interventions.

2.2. Construct of the Sustainable Outcomes Framework

The Framework consists of outcomes, drivers and criteria established for four levels of leadership described as follows:

- **Sustainable Outcomes:** six broadly applicable sustainable agriculture outcomes result from the adoption of practices and technologies aligned to drivers
- **Drivers:** key management strategies for delivering against each sustainable outcome varying in number from two to eight drivers per outcome
- **Leadership Levels:** four levels of differentiation describing the adoption of new strategies, practices, and technologies as well as behavioral differences used to assess a producers' progress against drivers and sustainable outcomes
- **Criteria:** indicators at four leadership levels of differentiation used to determine producer performance against each outcome and driver combination
- **Self-Assessment:** criteria are presented as self-diagnostic questions and delivered to producers in a digital self-assessment
- **Producer Leadership Performance:** a score generated based on the results of the self-assessment to show producer individual and group performance against drivers and outcomes
- **Practice Criteria:** Specific practices or technologies adopted to deliver a management strategy

Figure 1. Sustainable Outcomes Framework

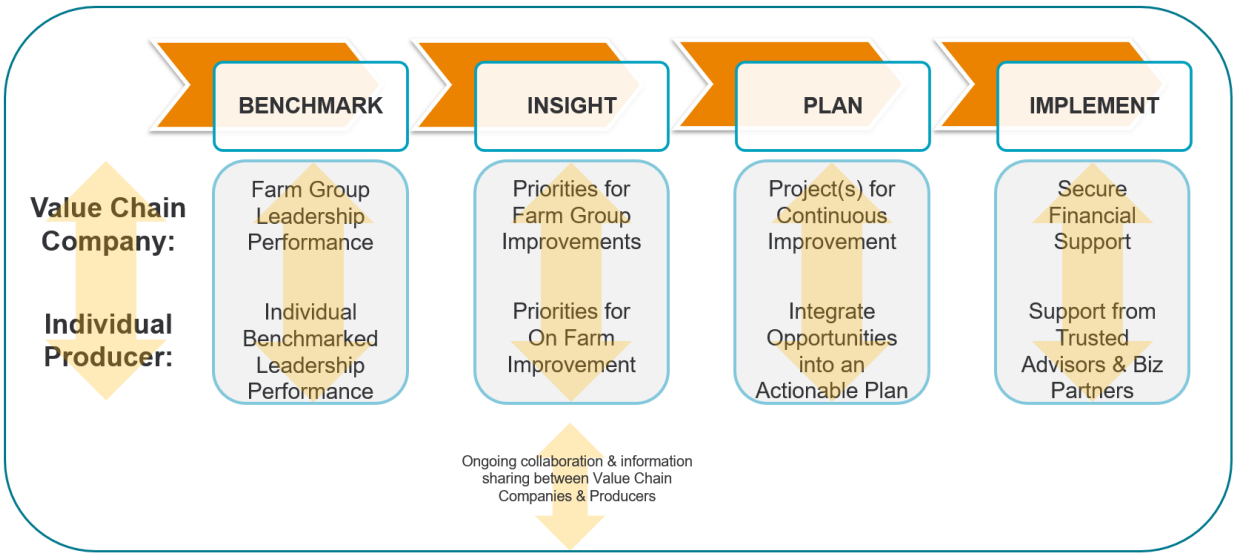


2.3. Process

The focus of the Standard is to drive continuous improvement in delivering sustainable outcomes through connecting producers with opportunities for improvement relevant to their situation. The cycle for continuous improvement has four basic steps that follow an annual cycle tied to the producers' production cycle.

- Benchmarks allow producers to see how they are performing relative to other similar producers in their region. Aggregate benchmarks are used to provide a measure of performance over time for a value chain company. Benchmarking is concluded after harvest.
- Insight from analyses of producer data is used to identify opportunities for improvements at an individual producer and aggregate level.
- These opportunities are incorporated into plans, in advance of the next crop production cycle, to enable implementation of improvements. Plans established by value chain actors include objectives for continuous improvement.
- Implementation involves securing financial support where needed for producers working with support from their trusted advisors to implement new management strategies and practices.

Figure 2. Process for continuous improvement

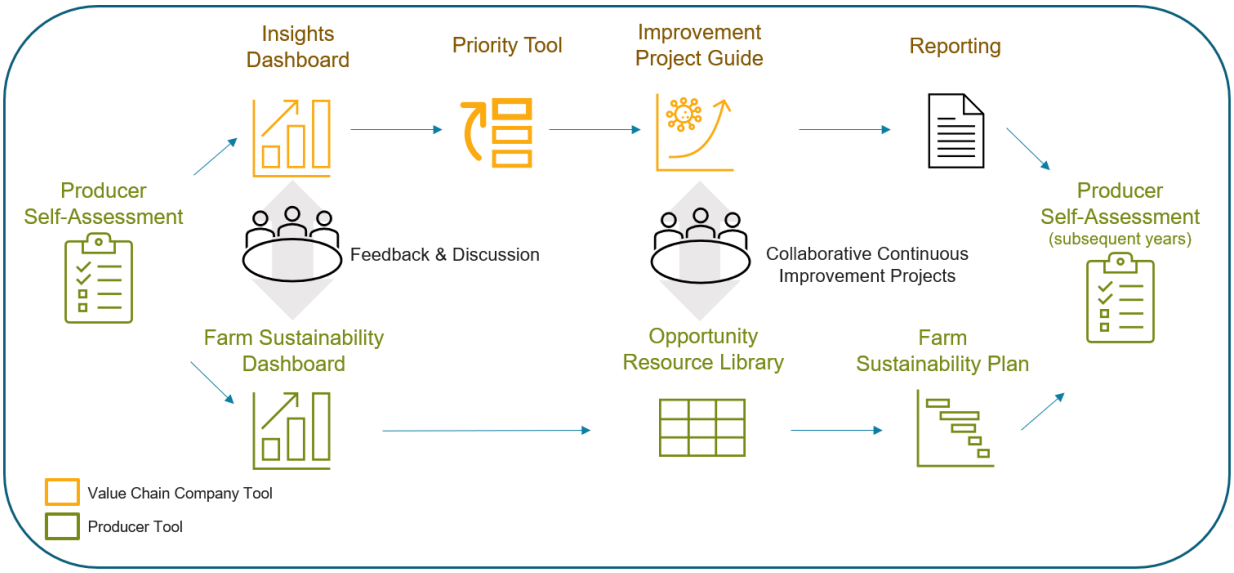


2.4. Tools Enabling Continuous Improvement towards Goals

A suite of tools (Figure 3) enables consistent implementation of the Sustainable Outcomes in Agriculture Standard as follows:

- **Producer Self-Assessment Tool:** a producer interface digital app for implementing the self-assessment and delivering feedback or other pertinent information to producers
- **Insights Dashboard:** a dynamic interactive dashboard with aggregated results and performance insights for groups of producers
- **Farm Sustainability Dashboard:** a dynamic interactive dashboard customized for each participating producer with benchmarked results for each outcome and driver as well as opportunities for improvements
- **Priority Tool:** a synthesis of areas of focus for continuous improvement projects based on value chain company priorities, crop production region priorities and producer leadership performance results
- **Improvement Project Guide:** a proven systematic process for establishing and implementing continuous improvement projects to drive change towards sustainable outcomes in a group of producers
- **Opportunity Resource Library:** a compendium of resources organized by opportunities for improvements towards sustainable outcomes for use by individual producers and experts supporting producers
- **Farm Sustainability Plan:** actionable and farm specific plans for improvements towards sustainable outcomes

Figure 3. The process for continuous improvement is supported through various tools



3. Producer Group Requirements

3.1. Selection of Priority Areas

Priority topics to include in the assessment are based on value chain company or organization reporting needs as well as sustainability challenges and regenerative agriculture opportunities for a target region. All potentially applicable sustainable outcomes and drivers should be included in the self-assessment. It may be necessary to refine these selections as information is collected over time from producers and the production challenges and opportunities are better defined or the program has matured to focus on select priorities for continuous improvement.

3.2. Producer Group Selection

Producers are selected for inclusion in a group assessment by the value chain company to represent crop production in a geographic area or other grouping of interest. The Producer Group can be organized independently as a cooperative or association, or by a trader or other value chain actor. The number of relevant producers in the group assessed may vary dependent on the diversity of cropping systems in the region. Information is aggregated at the group level and should represent producers that have similar crop production.

3.3. Producer Leadership Performance Levels

Performance is assessed at four different levels characterizing the leadership of producers in attaining applicable sustainable outcomes defined within the Standard. The focus of the Standard is on new, recently implemented practices and the expansion of adoption of beneficial practices. Furthermore, the leadership levels although associated with the adoption of certain practices and technologies are more comprehensive in that they include dimensions of duration, scale and influence necessary to fully assess and deliver continuous improvement. This is especially relevant given the complexity of agricultural systems and decision making and as well as the

persistence and time often necessary to successfully implement changes and new practices that result in a positive impact.

Producer leadership levels are the core to assessing performance in the Sustainable Outcomes in Agriculture Standard.

Leadership Level 1 (Essential): Fully compliant with regulatory requirements

> *Producer Profile: Compliant with local, state and federal regulations.*

Leadership Level 2 (Basic): Beneficial management practices are well established in the operation and consistent with meeting the industry standard. Engaged in education and learning with awareness of barriers to adoption of new crop management and conservation practices.

> *Producer Profile: Uses farm records and in-season data. Plans crop inputs for current year with precision at the field level. Measures energy and fuel use. Maintains equipment and infrastructure. Aware of the need to adopt practices that benefit soil health and the conservation of natural resources. The health and safety of workers, neighbors, livestock and consumers are considered in practices. Provides support for the local community.*

Leadership Level 3 (Medium): Beneficial management practices are well established in the operation informed by data collected and experts. New practices and technologies are being implemented consistent with improving the industry standard. Barriers to adoption of practices that benefit conservation are being overcome.

> *Producer Profile: Uses digital farm records, farm planning and expert advice to optimize inputs, operations and outputs. Efficiencies from precision at a field and sub-field level as well as from measurement of inputs and conditions. Measures are used to improve the efficiency of energy and fuel use. Equipment and infrastructure are optimized or updated. New practices are adopted that benefit soil health. Non-crop conservation areas are maintained or restored. Recent improvements to practices for health and safety of workers, neighbors, livestock and consumers. Local community support is provided through learning activities.*

Leadership Level 4 (High): Whole farm management and optimization for long-term profitability, risk reduction and the conservation of natural resources. Collaboration and influence beyond the farm provide benefits for the operation as well as for the broader community.

> *Producer Profile: Digitally enabled whole farm management. Increased precision at scale with adoption of innovation for optimization of outputs, cost-savings, risk reduction and market benefits. Demonstrated savings from energy and fuel use measurement. Farm plans are optimized and customized based on historic experience. Long-term plans are established for the conservation and restoration of natural resources. Collaboration with others on the adoption of equipment and infrastructure improvements as well as on projects that benefit soil health and the conservation of natural resources. Proactive engagement and communication to improve practices for health and safety of workers,*

neighbors, livestock and consumers. Incorporated new ways to support education and engagement in the local community.

4. Sustainable Outcomes and Drivers of Continuous Improvement

Six sustainable outcomes are defined in the Standard that have significant relevance to producers in making improvements in regenerative agriculture. Each outcome is associated with two to eight drivers which are the management strategies key to enabling continuous improvement. The sustainable outcomes provide the categories used for scoring to measure performance. Note that for purposes of reporting or providing additional insight, drivers can be aligned to alternative relevant outcomes such as "Reduction in Greenhouse Gas Emissions" or "Principles for Regenerative Agriculture" to meet the various needs of value chain actors.

4.1. Optimal Production

The Optimal Production outcome is defined as crops efficiently produced in the quantities, qualities, and timeliness necessary for financial viability and consistent with minimizing waste and reducing greenhouse gas emissions. Efficient and economically optimum crop health and production outputs.

There are eight drivers that embrace the management strategies necessary to deliver the Optimal Production outcome.

Use of Records: Refers to records of farm data and farm activities. Evaluates use farm records to optimize operations, planning, and communication.

Farm Planning: Refers to the creation of a farm plan for the production season. Evaluates the planning of inputs and practices to achieve both near and long-term objectives.

In-season Adjustments: Refers to the use of timely information for decisions on crop health. Evaluates the ability to adjust plans in-season through data integration and expert services.

Use of Precision and Decision Technologies: Refers to use of these technologies for seeding or planting and applications of crop protection and fertilizer products. Evaluates use of variable rate applications based on new technology and site-specific data/models (excludes irrigation).

Fuel Energy Measurement: Refers to measurement to improve efficiency and cost-savings. Evaluates the improvement in fuel efficiency and reductions in overall fuel usage.

Electricity Energy Measurement: Refers to measurement to improve efficiency and cost-savings. Evaluates the improvement in electricity use efficiency and reductions in overall electricity usage.

Equipment Management: Refers to efficiency and effectiveness of field and facility equipment. Evaluates the agronomic and economic optimization of equipment (excludes irrigation).

Crop Loss and Waste Reduction: Refers to minimizing both non-crop waste, crop losses and crop waste in the operation as well as the use of renewable sources of energy.

4.2. Water Impact

The Water Impact outcome is defined as improvements in the efficiency of irrigation water use and reductions in risks associated with the scarcity of water sources used for crop irrigation. Management of water holding mechanisms, delivery and drainage systems to enhance productivity and soil conditions as well as protect the quality of surface water and ground water.

There are three drivers that embrace the management strategies necessary to deliver the Water Impact outcome.

Irrigation Infrastructure: Refers to the efficiency of irrigation equipment and irrigation infrastructure. Evaluates the optimization of irrigation equipment and irrigation infrastructure.

Irrigation Planning: Refers to the use of plans to optimally deliver irrigation. Evaluates optimization of irrigation scheduling and mitigation of longer term, water risks.

Water Management: Refers to drainage and other aspects of surface and ground water management. Evaluates investments and collaborations to manage drainage, water quality and water movement.

4.3. Soil Health

The Soil Health outcome is defined as the enhanced resilience and health of soils over time to sequester carbon, increase biological activity, improve water holding capacity, increase fertility, support crop growth, and reduce impacts from extreme climatic conditions, pest outbreaks and nutrient imbalances. Management of crop production inputs aligned to soil conditions and crop needs to minimize greenhouse gas emissions. Soil conservation and management of non-crop and conservation areas to protect the quality of surface water and ground water.

There are five drivers that embrace the management strategies necessary to deliver the Soil Health outcome.

Runoff Erosion Management: Refers to conserving topsoil. Evaluates the continuity of soil conservation planning and practices that reduce runoff erosion.

Wind Erosion Management: Refers to conserving topsoil. Evaluates the continuity of soil conservation planning and practices that reduce wind erosion.

Soil Function: Refers to soil subsurface quality. Evaluates the adoption and continuity of practices to minimize soil disturbance, soil compaction leading to improvements in biological activity as well as fertility and water holding capacity.

Production for Conservation: Refers to conservation benefits from crop sequence. Evaluates the management and diversification of rotations to improve soil health and crop performance, including the idling and restoration of targeted areas.

Soil Measurement: Refers to the assessment of nutrients and other soil measures. Evaluates regular soil and foliar testing to optimize nutrient management and soil health.

4.4. Biodiversity and Habitat

The Biodiversity and Habitat outcome is defined as the protection and management of non-target species (e.g., pollinators, beneficials, wildlife) and their habitat to safe-guard and enhance habitat quality and biodiversity. Enhanced diversity of cropping systems and conservation of non-crop areas.

There are two drivers that embrace the management strategies necessary to deliver the Biodiversity and Habitat outcome.

Habitat Quality: Refers to the availability of habitat for native animals & plants. Evaluates the habitat quality and biodiversity incorporated into farm management and collaboration.

Pollinator Management: Refers to the availability of habitat for native pollinators and honey bees. Evaluates the stewardship of non-crop and natural areas for native pollinators and honey bees.

4.5. Human and Animal Health

The Human and Animal Health outcome is defined as safe-guarding the well-being of agricultural workers, adjacent neighbors and livestock. It includes the safe-guard of both human and animals consuming crop ingredients in consumer products.

There are five drivers that embrace the management strategies necessary to deliver the Human and Animal Health outcome.

Product Selection: Refers to minimizing impact from product choice. Evaluates the selection of farm practices and products to protect the health and safety of workers, neighbors and livestock.

Worker & Neighbor Protections: Refers to the health of people and domestic animals. Evaluates the implementation of communication policies and protective practices to secure the safety and comfort of workers, neighbors and livestock.

Pest-related Health Management: Refers to minimizing impact from pest-related health issues. Evaluates the mitigation of human and animal health risks associated with the crop from field production through storage.

Waste Management: Refers to ensuring use of waste streams as well as the management of wastewater is appropriate and not harmful to humans or the environment.

Hazardous Material Management: Refers to the appropriate sourcing, labelling and storage of hazardous materials to minimize risks.

4.6. Community Leadership

Community leadership supports the local community including workers on the operation and promotes opportunities for education, training and understanding of agriculture. It also included leadership, outreach and youth development within communities of farming professionals and community access to conservation areas.

There are four drivers that embraces the management strategies necessary to deliver the Community Leadership outcome.

Community Engagement: Refers to the enrichment of the community. Evaluates community understanding and support for agriculture and community enrichment through consistent engagement.

Worker Opportunities: Refers to the appropriate recruitment of workers and opportunities provided to workers when under employment.

Education and Training: Refers to how the operation and its workers stays updated on changes to legislation, safety training and training on compliance.

Worker Conditions: Refers to how the conditions in the operation meet the needs and comfort of its hired workers.

5. Sustainable Outcome Measurement

5.1. Criteria

The focus of the Standard is on engaging producers in continuous improvement. Therefore, included in the criteria are farm management activities that are foundational to making overall improvements against sustainable outcomes. These foundational activities include keeping records, using records to inform decisions and planning in advance of the growing season.

Each driver selected for delivering a sustainable outcome, has criteria established at each of four levels of leadership. Producers conforming to a specific level of leadership for the driver must meet the criteria specified for that level. Criteria each have a unique identifier.

Table 1. Outcome for Continuous Improvement = Optimal Production

Driver of Change	Level	Criteria	Identifier
Use of Records	1	Criteria for Levels 2, 3 and 4 are not met.	OR-1
	2	Farm records used in some form for key operational activities for crop and farm management this year.	OR-2
	3	Electronic records used to inform recent and future whole farm management.	OR-3
	4	Farm Management System(s) used to plan investments, assess profitability, track improvements, and communicate with farm partners and clients.	OR-4
Farm Planning	1	Criteria for Levels 2, 3 and 4 are not met.	OP-1

Driver of Change	Level	Criteria	Identifier
	2	Most of the inputs necessary for my crop production are planned before the field season.	OP-2
	3	Crop plans to optimize inputs as well as yield and quality are used on most of the crop acres.	OP-3
	4	Customized crop plans based on previous year's data are used to support multi-year plans to optimize yield, stability and quality.	OP-4
In-season Adjustments	1	Criteria for Levels 2, 3 and 4 are not met.	OS-1
	2	Planned practices and schedules adjusted during the season to improve or maintain crop health and production.	OS-2
	3	Use of experts' services (e.g., legal professionals, Certified Crop Advisor, Pest Control Advisor, university extension agents, employee specialists, consulting agronomist or tools) to monitor and adjust planned in-season farming activities and crop inputs.	OS-3
	4	Data is integrated from across my farm (such as equipment, personnel, support services), and combined with external information for immediate data capture, decision support and management.	OS-4
Use of Precision & Decision Technology	1	Criteria for Levels 2, 3 and 4 are not met.	OT-1
	2	Measures used in the field operations to improve crop production precision at the field level (as opposed to treating all fields the same).	OT-2
	3	Crop inputs are varied within fields for more precision in crop production.	OT-3
	4	New and innovative technologies are adopted to improve the precision of crop production input use and decisions in-season, on an ongoing basis.	OT-4
Fuel Energy Management	1	Criteria for Levels 2, 3 and 4 are not met.	OF-1
	2	Fuel energy use is measured on the farm.	OF-2
	3	Use of measurements, analyses or audits of fuel use on the farm to implement improvements and increase efficiency.	OF-3
	4	Demonstrated cost savings from fuel savings over at least 3 years on the farm as a result of participation in energy audits.	OF-4
Electricity Energy Management	1	Criteria for Levels 2, 3 and 4 are not met.	OE-1
	2	Access to electricity use records for the farm.	OE-2
	3	Use of measurements, analyses or audits of electricity use on the farm to implement improvements and increase efficiency.	OE-3
	4	Demonstrated cost savings from electricity savings over at least 3 years on the farm as a result of participation in energy audits.	OE-4
Equipment Management	1	Criteria for Levels 2, 3 and 4 are not met.	OM-1
	2	Equipment used on the farm is calibrated, monitored and maintained to ensure proper functioning.	OM-2
	3	Equipment used on the farm is optimized for overall efficiency and agronomic and economic performance.	OM-3
	4	Participation in local or regional partnerships/service relationships relevant to optimizing use of farm equipment.	OM-4
Crop Loss and Waste Reduction	1	Criteria for Levels 2, 3 and 4 are not met.	OW-1
	2	Measures are used to reduce, reuse and recycle non crop waste and to avoid crop and crop residues going to landfill.	OW-2
	3	Renewable energy sources are used in production.	OW-3
	4	Contracts in place to market crops to minimize harvest loss, processing loss and storage losses of crop.	OW-4

Table 2. Outcome for Continuous Improvement = Water Impact

Driver of Change	Level	Criteria	Identifier
Irrigation Infrastructure	1	Criteria for Levels 2, 3 and 4 are not met.	WI-1
	2	Monitor, assess and maintain irrigation equipment and infrastructure.	WI-2
	3	Calibrate, modify and replace irrigation equipment and infrastructure on both a farm and field level.	WI-3
	4	Adopt changes and upgrade irrigation equipment and infrastructure to enable greater efficiency and precision.	WI-4
Irrigation Planning	1	Criteria for Levels 2, 3 and 4 are not met.	WP-1
	2	Implement a field level, in-season plan for efficiently scheduling the timing and amount of irrigation on a crop specific basis.	WP-2
	3	Make use of expert knowledge and systems to optimize water use and ensure appropriate use of water conservation practices.	WP-3
	4	The crop production irrigation plan has been optimized over time considering long-term water availability and challenges in the area.	WP-4
Water Management	1	Criteria for Levels 2, 3 and 4 are not met.	WQ-1
	2	Systems for water management are maintained on the farm.	WQ-2
	3	Water management structures on the farm for drainage water from irrigation or surface runoff have been updated or installed.	WQ-3
	4	Collaboration with others in my area on watershed or aquifer initiatives to improve water quality.	WQ-4

Table 3. Outcome for Continuous Improvement = Soil Health

Driver of Change	Level	Criteria	Identifier
Runoff Erosion Management	1	Criteria for Levels 2, 3 and 4 are not met.	SR-1
	2	Currently have or plan to implement soil conservation practices on the farm to address runoff erosion.	SR-2
	3	Adopted a new soil conservation practice(s) to address runoff erosion at a field level in the past 3 years.	SR-3
	4	Implemented a long-term soil conservation plan to minimize runoff erosion across the farm.	SR-4
Wind Erosion Management	1	Criteria for Levels 2, 3 and 4 are not met.	SW-1
	2	Currently have or plan to implement soil conservation practices on the farm to prevent erosion from wind.	SW-2
	3	Adopted a new soil conservation practice(s) to address wind erosion at the field level in the past 3 years.	SW-3
	4	Implemented a long-term soil conservation plan to minimize wind erosion across the farm.	SW-4
Soil Function	1	Criteria for Levels 2, 3 and 4 are not met.	SF-1
	2	Currently have or have plans to adopt practices to minimize soil disturbance including compaction.	SF-2
	3	Adopted a new practice to reduce tillage and compaction at the field level in the past 3 years.	SF-3
	4	Implemented a plan for long-term maintenance of strip till or no-till practices.	SF-4
Production for Conservation	1	Criteria for Levels 2, 3 and 4 are not met.	SC-1
	2	Maintain a rotation of two or more annual or perennial crop(s) on the same field.	SC-2
	3	Assess and update crop rotations based on pest control, resistance management, soil organic matter, nutrients and economic return.	SC-3
	4	Restored land (i.e., that has Highly Erodible Land, high conservation value or was less productive) by taking it out of annual crop rotation in the past 3 years.	SC-4

Driver of Change	Level	Criteria	Identifier
Soil Measurement	1	Criteria for Levels 2, 3 and 4 are not met.	SM-1
	2	Perform soil and/or foliar testing to assess requirements for soil amendments or crop nutrient input needs on the farm.	SM-2
	3	Annually perform soil testing on every field to assess soil health and optimize nutrient management.	SM-3
	4	Participate in projects that support and measure nutrient management for soil health.	SM-4

Table 4. Outcome for Continuous Improvement = Biodiversity and Habitat

Driver of Change	Level	Criteria	Identifier
Habitat Quality	1	Criteria for Levels 2, 3 and 4 are not met.	BH-1
	2	Awareness of sensitive areas and species on the farm and adjacent areas and consider them in the management of the cropland.	BH-2
	3	Actively maintain or restore cropped and non-cropped areas on the farm to improve the quality of habitat for biodiversity. Respect for historically significant and archaeological sites, where applicable.	BH-3
	4	Collaborate with others at the regional level on initiatives to improve biodiversity, restore species and/or facilitate migration paths.	BH-4
Pollinator Management	1	Criteria for Levels 2, 3 and 4 are not met.	BP-1
	2	Non-crop or natural areas exist on the farm that provide habitat for pollinators.	BP-2
	3	Established new habitat or improved the quality of habitat for pollinators on the farm in the past 3 years.	BP-3
	4	Collaborate with neighbors and others at the regional level on pollinator initiatives.	BP-4

Table 5. Outcome for Continuous Improvement = Human and Animal Health

Driver of Change	Level	Criteria	Identifier
Product Selection	1	Criteria for Levels 2, 3 and 4 are not met.	HS-1
	2	Consider the health and safety of workers, neighbors and livestock when choosing farm chemical products.	HS-2
	3	Use alternative non-chemical practices and advanced conservation practices to optimize/reduce the use of farm chemicals.	HS-3
	4	Actively communicate in response to complaints/questions concerning operations and product selection (e.g., drift, dust, odor, visual, PPE).	HS-4
Worker and Neighbor Protection	1	Criteria for Levels 2, 3 and 4 are not met.	HW-1
	2	Protective measures are implemented to ensure the comfort and safety of workers, neighbors and livestock. Workers are provided personal protective equipment in good working condition and access to first aid supplies.	HW-2
	3	Practices have been added to ensure the comfort and safety of workers, neighbors or livestock in the past 3 plus years.	HW-3
	4	Consider and respond to complaints or incidents and take corrective actions and collaborate/communicate about those actions.	HW-4
Pest Related Health Management	1	Criteria for Levels 2, 3 and 4 are not met.	HP-1
	2	When the crop has potential mycotoxin risks, choices (e.g., genetics, crop protection, harvest protocols, storage methods) are made to lower risk.	HP-2
	3	The farming, pest management, and harvest program is designed to prevent infection/spread by pests with human or animal health concerns.	HP-3

Driver of Change	Level	Criteria	Identifier
	4	Conduct additional residue and health risk testing and/or audits according to specifications and share results with supply chain partners, and others.	HP-4
Waste Management	1	Criteria for Levels 2, 3 and 4 are not met.	HA-1
	2	Untreated sewage is not used and any use of organic manure, sludges, sludge water and/or industrial waste is not harmful.	HA-2
	3	Wastewater is managed to protect soil, surface water and groundwater.	HA-3
	4	Records are maintained showing conditions are met for proper disposal of wash out and other wastewater and used to inform ongoing improvements in wastewater management.	HA-4
Hazardous Material Management	1	Criteria for Levels 2, 3 and 4 are not met.	HH-1
	2	Hazardous materials are stored in facilities for hazardous materials that are secure, dry and ventilated, located to minimize risks.	HH-2
	3	Waste storage facility management is informed by a risk assessment to avoid exposure to people or livestock, cross-contamination, or contamination of the environment.	HH-3
	4	Hazardous materials including pesticides are from trustworthy sources with storage in original labelled containers or labelled bulk containers.	HH-4

Table 6. Outcome for Continuous Improvement = Community Leadership

Driver of Change	Level	Criteria	Identifier
Community Engagement	1	Criteria for Levels 2, 3 and 4 are not met.	CE-1
	2	Participate in local community events, support local businesses and/or make financial contributions to community associated with the farm.	CE-2
	3	Offer crop production, conservation and/or restoration species/habitat activities for my community for learning, access and outreach.	CE-3
	4	Incorporated new ways to share farming, conservation and restoration initiatives for species and habitat with my community in the past 3 years.	CE-4
Worker Opportunities	1	Criteria for Levels 2, 3 and 4 are not met.	CW-1
	2	Hired workers are contracted through reputable recruiters or farm labor contractors that ensure forced or bonded labor is prohibited, and do not charge recruitment fees or costs. Recruiters and contractors confirm workers have a right to work.	CW-2
	3	Hired workers are paid regularly, paid overtime, have one day off work per week, and have equal opportunities. Any legally required benefits, such as paid vacation, sick leave, and compensation for work-related injuries are provided. Contracts are established in accordance with regulation and best practice and workers are informed of their rights.	CW-3
	4	Investments are made in education of employees that are pertinent to further advancements in their work opportunities.	CW-4
Education & Training	1	Criteria for Levels 2, 3 and 4 are not met.	CT-1
	2	Relevant training is provided for all farm hired workers, an emergency action plan (including review of first aid procedures) and worker contact information is available, and the operation seeks support from experts or other resources to stay updated on changes to legislation and industry requirements or guidance including maintaining records.	CT-2
	3	Vulnerable and workers under the age of 18 are not permitted to handle hazardous materials and other workers in proximity to hazardous materials (e.g., pesticides, fuel, fertilizer, & etc.) have instructions, training, and equipment for handling, applying, cleaning, safety and dealing with accidents and spills.	CT-3

Driver of Change	Level	Criteria	Identifier
	4	Awareness and training of personnel with regards to hunting, fishing and harvesting of sensitive or endangered plants and animals or other materials is provided and permission for access is managed to prevent illegal harvesting.	CT-4
Worker Conditions	1	Criteria for Levels 2, 3 and 4 are not met.	CC-1
	2	Facilities are provided for all hired workers to enable potable water, shade and sanitation during their shift and workers are allowed regular breaks.	CC-2
	3	If hired workers reside on the farming operation or are provided temporary housing, access to appropriate cooking facilities, potable water, and clean, safe accommodation and sanitary facilities is provided.	CC-3
	4	Hired workers have the right of association or union membership if they choose, and the functioning of such organizations is allowed.	CC-4

5.2. Specific Management Practices

The focus of the Sustainable Outcomes in Agriculture Standard is on continuous improvement. Therefore, to provide additional insight on relevant opportunities in regenerative agriculture for producers, an assessment of detailed practices, technologies, crop inputs and outputs is included in the Standard. This information on specific practices is used to develop insight for continuous improvement opportunities and projects.

5.2.1. Nutrient and Pest Management

The Standard integrates The Sustainability Consortium (TSC) Responsible Pest Management (RPM) framework (see Appendix 1) which provides a rubric of drivers and practices to deliver pest management outcomes for:

- Environmental Stewardship
- Long-term System Resiliency
- Human and Animal Health
- Optimal Production

The Sustainability Consortium solution for the measurement of Responsible Pest Management in cropping systems was developed through a diverse stakeholder process. It integrates the principles and strategies of Integrated Pest Management (IPM) as well as regenerative agriculture, promoting improvement towards desired outcomes for successful pest management that rely on management of the cropping system and nature. The framework recognizes the importance of differentiating producer leadership performance in attaining these outcomes. Each outcome for pest management is associated with the implementation of tangible and diverse management strategies and practices to manage pests through a systems approach that relies on the judicious use of pesticide inputs only when needed.

Table 7. Practices and Outcomes for Pest Management (source: The Sustainability Consortium Responsible Pest Management Framework – see Appendix 1)

Practice Criteria	Environmental Stewardship	Long-term System Resiliency	Human & Animal Health	Optimal Production	Identifier
Use a Certified Crop Advisor (CCA), IPM consultants or University experts for pest monitoring and in season decisions				x	PM-1
Pest management plan used				x	PM-2
Crop scouting or monitoring for presence of key pests				x	PM-3
Pest management practices achieve profitable yield and quality				x	PM-4
Maintain field-level records of applications, equipment calibration, & scouting				x	PM-5
Rotate chemistries/modes of action based on IRAC, FRAC, HRAC classification		x			PM-6
In-season data gathering influences decisions		x			PM-7
Precautions taken to not introduce new pests		x			PM-8
Seed varieties selected for genetic protection from pests		x			PM-9
Biological products used		x			PM-10
Timing of planting, crop rotation or equipment cleaning to reduce pests		x			PM-11
Maintain field-level records of all pest management practices				x	PM-12
Maintain and calibrate spray rates on application equipment at least once per season	x				PM-13
Adjustments made to application equipment/methods to better target pests	x				PM-14
Limit applications to areas of the field where treatment is necessary	x				PM-15
Inform neighbors, workers, & stakeholders of pesticide application activities			x		PM-16
Choose low hazard and low risk crop protection product option			x		PM-17
Information from scouting, imagery, surveys, models/alerts as well as experts used to optimize the pest control program				x	PM-18
New practice(s) adopted in past year		x			PM-19
Practices optimized to improve profitable yield and quality				x	PM-20

Practice Criteria	Environmental Stewardship	Long-term System Resiliency	Human & Animal Health	Optimal Production	Identifier
Practices analyzed to ensure market specifications or standards are met				x	PM-21
Pest monitoring beyond own farm to selectively target pests	x				PM-22
Pest monitoring from neighboring properties		x			PM-23
Resistance to pests evaluated before and after implementation of a pest control practice		x			PM-24
Real-time, field-level weather information used	x				PM-25
Long-term effectiveness of practices reviewed		x			PM-26
Practices used protect or enhance natural/biological pest controls		x			PM-27
Practices used benefit non-target areas and beneficial insects	x				PM-28
Map environmental or human inhabited areas to inform your stewardship of these areas	x				PM-29
Technology used to prevent off-target applications (e.g., variable rate application technology, GPS guided field equipment, other)	x				PM-30
Collaborate in information and knowledge sharing initiative(s)		x			PM-31
Information used to minimize negative impacts on non-target areas and non-target organisms	x				PM-32
Resources/tool used to get comparative information on pesticide options			x		PM-33
Neighbor, community, and worker communications in place			x		PM-34
Act on feedback received to minimize potential for exposure to application activities			x		PM-35
Use tools/information on pest control options and share with others			x		PM-36
Records and analyses used to plan for the following year				x	PM-37

Practices for Nutrient Management are mapped to the same outcomes as for Pest Management. Data is also collected on nutrient inputs used on crop production as well as crop yield outputs.

Table 8. Practices and Outcomes for Nutrient Management

Practice Criteria	Environmental Stewardship	Long-term System Resiliency	Human & Animal Health	Optimal Production	Identifier
Formal nutrient management plan in place				x	NM-5
Use economic optimum nutrient rate				x	NM-6
Use 4R Nutrient Stewardship				x	NM-7
Program timed for nutrient availability and crop needs				x	NM-8
Strategic application of nutrients during target growth stages				x	NM-9
Crop variety considered in decisions		x			NM-10
Nutrients applied in forms suitable for soil conditions		x			NM-11
Use soil biological amendments/stimulants		x			NM-12
New practice(s) adopted in past year		x			NM-13
Fall-applied nitrogen avoided	x				NM-14
Nitrogen is split-applied (during growing season)	x				NM-15
Applications timed to minimize runoff, leaching	x				NM-16

5.2.2. Conservation Management

Conservation practices important for improving soil, water quality, biodiversity and habitat, and reducing greenhouse gas emissions are included in the Standard.

Table 9. Conservation Practices for Soil Health, Water Quality, Biodiversity & Habitat and reducing Greenhouse Gas Emissions

Practice Criteria	Soil Health	Water Quality	GHG Reduction	Biodiversity & Habitat	Identifier
Acres of no-till or direct drilling	x	x	x	x	CO-5
Acres of strip tillage	x	x	x	x	CO-6
Acres of other reduced or minimum tillage	x	x	x	x	CO-7
Percent of no-till or direct drilling acres continuous in the same field (year on year)	x	x	x	x	CO-8
Cover crops grown [legumes (e.g., clover, triticale); grasses including small grains (e.g., rye, wheat, triticale); brassicas (e.g., turnips, radishes); legume/grass mix; brassica/grass mix; permanent cover crop that is mowed; winter green manure crop]	x	x	x	x	CO-9
Cover crops or other crops planted to cover and benefit the soil after the main crop is harvested [cover crop planted; double crop; perennial crop; intercropping; stubble cover remains on soil]	x	x	x	x	CO-10

Practice Criteria	Soil Health	Water Quality	GHG Reduction	Biodiversity & Habitat	Identifier
Approximate number of days of the year on average fields had roots or living plants. [Less than 130 days per calendar year; 130 days to 300 days per calendar year; More than 300 days per calendar year]	x	x	x		CO-11
Measures taken to prevent soil erosion identified in an expert assessment	x	x			CO-12
Use In-field erosion control	x	x			CO-13
Grassed waterways in place	x	x		x	CO-14
Buffer or Filter Strips in place	x	x		x	CO-15
Field Borders in place	x	x		x	CO-16
Riparian vegetation in place	x	x		x	CO-17
Use Water/sediment basin/ponds	x	x			CO-18
Use Saturated buffers	x	x			CO-19
Use Nutrient removal wetlands	x	x			CO-20
Install or maintain field drainage tile	x	x			CO-21
Use controlled wheel traffic	x	x			CO-22
Increased % of crop residue in fields in past year	x	x	x		CO-23
Participated in soil health training in past year	x	x	x		CO-24
Participated in soil health field day in past year	x	x	x		CO-25
Use contour farming	x	x			CO-26
Constructed or maintain field terraces	x	x			CO-27
Permanent windbreak(s)/shelterbelt(s) in place	x	x	x	x	CO-28
Manage invasive species				x	CO-29
Use a formal conservation plan developed by experts (e.g., UDSA NRCS)	x	x	x	x	CO-30
Greenhouse gas (GHG) emissions are measured for the operation using recognized tools, studies or experts.			x		CO-31
Take measures to facilitate bird nesting grounds or migratory paths				x	CO-32
Crop rotation provides conservation benefit	x	x		x	CO-33
Intercropping	x	x		x	CO-34
Seeded perennials in past year	x	x	x		CO-35
Non-cropped acres on farm (fallow, set-aside, conservation, large buffers and waterways, prairie, shrublands, woodlands, grasslands, timber and other non-cropped land)	x	x	x	x	CO-36
Riparian corridor managed to create and maintain areas that extend down into the groundwater, up above the canopy, outward across the floodplain, up the near-slopes that drain into the water, laterally into the terrestrial ecosystem and along the watercourse at a variable width	x	x	x	x	CO-37
Agriculture conservation easement to protect, restore and enhance wetlands, grasslands, forests, or working farms and ranches	x	x	x	x	CO-38

Practice Criteria	Soil Health	Water Quality	GHG Reduction	Biodiversity & Habitat	Identifier
through voluntary, legal agreements to permanently limit land usage to protect its conservation values					

The Standard will also utilize as needed, the "Land & Carbon Lab" global land monitoring system tool that provides satellite imagery to assess changes in land use. This global tool provides a worldwide 10-meter resolution dataset. Historical data provided is updated annually through the Bezos Earth Fund. It is implemented by Google and freely available for third parties to use. The tool monitors: land cover and land use; conversion and degradation; restoration and recovery; carbon stocks and flows; biodiversity; management activities; tenure and rights.

5.2.3. Livestock and Irrigation Management

Practices important for improving livestock and irrigation management are included in the Standard.

Table 10. Practices for Livestock Management and Irrigation Management

Management Category	Practice Criteria	Identifier
Livestock Management	Number of species of livestock that graze in fields	LM-1
Livestock Management	How livestock graze on fields [Livestock graze on cover/forage crop; Livestock graze on cropping area (after harvest); livestock integrated in past year]	LM-2
Irrigation Management	Source of irrigation water for crop production [ground water; surface water]	IM-1
Irrigation Management	Type of irrigation system used [Flood/Furrow; Full coverage impact/rotator sprinkler; mini/micro sprinkler; drip irrigation; pivot; linear; wheel lines]	IM-2
Irrigation Management	Basis of decision on when to irrigate [experience; pressure bomb; evapotranspiration (ET) index; soil moisture sensor; set frequency]	IM-3
Irrigation Management	Use of precision technologies to control irrigation according to zones	IM-4

5.2.4. Practices for Regulation Management, Farms Records Management, Community Management and Storage Management

Practices important for improving regulation management, farm record management, community management and storage management are included in the Standard.

Table 11. Practices for Regulation Management, Farms Records Management, Community Management and Storage Management

Management Category	Practice Criteria	Identifier
Regulation Management	The operation complies with standards and applicable laws in order to prevent bribery, corruption, fraud and negative human rights impacts.	RM-1
Regulation Management	The operation complies with all national, state, provincial, and/or local laws and regulations that apply to farming operations	RM-2
Farm Records Management	Farm records include details of sourcing (permitted and registered), inventory, handling, storage and disposal of materials, equipment, containers and waste; hiring, payment, training, instructions, safety and well-being of workers; accident reports (if applicable), application and use of hazardous materials including PPP, GMOs, fertilizers and fuel;	FM-1

Management Category	Practice Criteria	Identifier
	and the harvest, storage and delivery of quality products to meet market specifications, where applicable.	
Farm Records Management	All legal documents pertaining to the property such as land titles, deeds, and leases as well as permits, contracts for sales, risk assessments, land conversion, and financial should be organized and available. The operation has analytical reports for soil, irrigation water quality and food safety as appropriate as well as satellite or aerial maps both historical and current to support land use change, presence of sensitive or endangered species, and changes of practices.	FM-2
Farm Records Management	Farm records are used to ensure compliance with regulations and permits as well as conformance with industry guidelines associated with farm and production operations including the sourcing and use of inputs (such as PPP), infrastructure design and management of water quality, labor, cross-contamination of GMO, waste and hazardous materials, where applicable.	FM-3
Farm Records Management	Farm records are used for product tracking and mass balance, where relevant.	FM-4
Farm Records Management	Contracts in place for the purchase of products consider specification, price, volume, and payment terms, where relevant.	FM-5
Farm Records Management	Where applicable, farm records document seed or propagation material used is high quality and obtained from quality sources.	FM-6
Community Management	Practices implemented to support employees [safety training; training records kept; education opportunities provided; options for health insurance].	CM-1
Community Management	Plan in place to increase involvement in the community over the next 3 years.	CM-2
Community Management	Measures taken to control dust from roadways and harvest [water roads; low dust equipment; other].	CM-3
Community Management	The operation has a grievance mechanism in place for permanent, temporary and seasonal employees.	CM-4
Community Management	Employment of workers under the age of 18 is managed in accordance with legislation and best practices (e.g., ILO Convention 138). All workers under the age of 18 who are authorized to work on the farm are enrolled in a recognized schooling program.	CM-5
Storage Management	Where applicable, dedicated areas are used to protect seedlings and plantlets.	ST-1
Storage Management	If buyer specifications require non-GMO content, procedures are in place to prevent cross-contamination with GMO production. These procedures include segregation of materials during planting, growing, harvest, storage and delivery including cleaning of equipment and storage areas to remove any GMO crops; buffers between cross pollinating crops, and segregation during processing and storage as well as final delivery.	ST-2

5.3. Producer Self-Assessment

A digital self-assessment that is easy for producers to understand assesses criteria for each outcome and driver combination selected for assessment as well as relevant indicator practices. The information from producers may be collected periodically through the season and/or after harvest. The frequency of the assessment is typically annually to establish a reliable baseline and to assess change over time.

5.4. Leadership Performance Scores

Leadership performance scores are based on results from the self-assessment for each of the criteria.

5.4.1. Single Producer

A single leadership performance level is assigned for each sustainable outcome by selecting the maximum leadership level attained for each driver from the self-assessment results. Scores are assigned to each level (Table 12), then these scores are averaged across drivers to create a single score for the outcome.

Table 12. Example of how results from the producer self-assessment are used to create a score.
Sustainable Outcome = Soil Health

Driver	Self-Assessment Result			Assigned Level	Score Assigned for Driver*	Score Assigned for Outcome (average across drivers)	Leadership Level for Outcome**
Runoff Erosion Management	B			B	1	1.4	Basic
Wind Erosion Management		M		M	2		
Soil Function	B			B	1		
Production for Conservation	B	M	H	H	3		
Soil Measurement				E	0		

*Essential (E) = 0 points, Basic (B) = 1 point; Medium (M) = 2 points; High (H) = 3 points

** To assign a Leadership Level for each outcome: all scores <0.5 equal Essential; > 0.5 and < or = 1.5 equals Basic, > 1.5 and < or = 2.5 equals Medium, > 2.5 equals High.

5.4.2. Group of Producers

Prevalence charts and distributions of the scores of individual producers are used to represent the group of producers against which an individual producer is compared.

6. Generating Insight for Continuous Improvement

6.1. Benchmarks for Individual Producers

Individual producers participating in the self-assessment receive feedback on their performance. The feedback is confidential to the producer and it's their choice on if or how their information gets shared. The leadership performance for each individual producer is graphically benchmarked against the leadership performance for the group of producers. A distribution is generated showing individual and group performance for each sustainable outcome included in the assessment. Individual producer performance is compared to producers with the highest level of performance for each driver and the greatest opportunities for improvements at a driver level are identified for the individual producer.

6.2. Benchmarks for Groups of Producers

Value chain companies receive feedback on the leadership performance for their group of producers which can be tracked over time. The producer group information on leadership performance can be viewed at an aggregate level by each sustainable outcome or at a driver level. Drivers with the greatest opportunities for improvements across the group of growers are identified.

7. Management

7.1. Management Structure and Governance

The Standard is owned and managed by Syngenta and resides and is administered within the Syngenta Sustainable Solutions program. There are four key roles for the management and governance of the Sustainable Outcomes in Agriculture Standard as follows:

- **Single Owner:** Overall accountability for the Standard.
- **Single Controls Manager:** Manages maintenance of version types, quality assurance and results.
- **Single Development Manager:** Manages user feedback and ongoing enhancements.
- **Customer Relations Manager(s):** Manages implementation including use agreements with value chain companies and producers.

See Appendix 2 for details on how these roles are managed within Syngenta Sustainable Solutions.

7.2. Implementation Mechanism

The Standard is implemented through a subscription agreement defining the scope of work and responsibilities for use of the Standard as well as costs.

7.3. Integrity

7.3.1. Transparency

The Standard will be made available to provide transparency together with legal language to help preserve the integrity of the Standard (see Appendix 3: Legal Language for Preservation of Integrity).

7.3.2. Quality Controls

A Standard Operating Procedure is in place for quality checks.

7.3.3. User Feedback and Complaints

Both value chain companies using the Standard as well as producers participating in the self-assessment are invited to provide feedback on their experience and the usefulness of the information provided through implementation of the Standard. The feedback information could include complaints and is reviewed annually, and improvements identified for inclusion in future versions.

7.3.4. Version Control

There are three versions of the Standard as follows:

- **Single source document:** This is the single reliable source documentation of the content of the Sustainable Outcomes in Agriculture Standard that is updated according to the revision schedule.
- **Specific user version:** This version of the Standard has had language, practices and technologies customized for a specific application such as region, cropping system or reporting needs of a value chain actor.

- **Beta version:** This version of the Standard has significant changes used to inform future enhancements.

7.3.5. Revision Schedule

The Standard is revised and updated at a frequency of a minimum of every three years, although revisions may be done on a more frequent basis, as needed.

8. Verification

The Standard includes verification for when value chain actors in the supply chain want to assign sustainability attributes or claims to volumes of crop ingredients or agricultural raw materials.

The verification process for the Standard is modeled on the SAI Platform's Farm Sustainability Assessment (FSA) approach to verification. Minimum requirements for verification bodies and auditors for the Standard are aligned with the *SAI Platform's FSA Third-Party Verification System Requirements* for FSA verification bodies and auditors.

Specific guidance for on-farm verification, sampling of farms for audit, procedures for farms that need corrective action, timing of audits and engagement of farms are detailed in the following reference volume.

Reference: Sustainable Outcomes in Agriculture Standard, Third Party Verification Manual version 1.0

9. Appendices

Appendix 1. The Responsible Pest Management Framework

Source: Final RPM Framework and User Guide April 16, 2021, The Sustainability Consortium

Basic Level: Standard Criteria and Identifiers corresponding to the RPM Framework

RPM Outcome	RPM Driver	RPM Basic Level	Standard Criteria & Identifier
Long-term System Resilience	Resistance management	Do you rotate or combine crop protection chemical modes of action based on IRAC, FRAC, HRAC classifications to prevent development of resistance?	Rotate chemistries/modes of action based on IRAC, FRAC, HRAC classification
			PM-6
	Information Use	Do you use in-season data gathering to make informed decisions regarding pest challenges in your crop?	In-season data gathering influences decisions
			PM-7
	Pest suppression	Are you able to identify key pests and do you take steps to prevent and suppress the introduction of pests into your cropping areas?	Precautions taken to not introduce new pests
			PM-8

RPM Outcome	RPM Driver	RPM Basic Level	Standard Criteria & Identifier
Environmental Stewardship	Non-target areas	Do you map sensitive areas to inform your stewardship of these areas, non-target organisms, and beneficial insects?	Map environmental or human inhabited areas to inform your stewardship of these areas
			PM-29
	Targeted application methods	Do you make adjustments to pesticide application equipment and methods to better target pests where applicable?	Adjustments made to application equipment/methods to better target pests
			PM-14
	Off-target pesticide application exposure	Do you maintain and calibrate spray rates on application equipment at least once per season?	Maintain and calibrate spray rates on application equipment at least once per season
			PM-13
Optimal Production	Recordkeeping	Do you maintain field-level records of crop protection applications, equipment calibration, and scouting?	Maintain field-level records of applications, equipment calibration, & scouting
			PM-5
	Yield, quality & supply chain	Do your pest management practices achieve profitable yield and quality?	Pest management practices achieve profitable yield and quality
			PM-4
	In-season information use	Do you regularly scout for the presence of key pests to inform your management actions throughout the season?	Crop scouting or monitoring for presence of key pests
			PM-3
Human & Animal Health	Risk management	Do you choose low hazard and low risk crop protection product options even if those are more expensive or require a more complex deployment?	Choose low hazard and low risk crop protection product option
			PM-17
	Worker and Neighbor protections	Do you inform neighbors, workers, and stakeholders of pesticide application activities?	Inform neighbors, workers, & stakeholders of pesticide application activities
			PM-16
	Pest-related health management	Are there potential mycotoxin risks (e.g., patulin) for your crop and do you manage farm activities (e.g., harvest protocols, storage methods) to lower that risk?	When the crop has potential mycotoxin risks, choices (e.g., genetics, crop protection, harvest protocols, storage methods) are made to lower risk.
			HP-2

Medium Level: Standard Criteria and Identifiers corresponding to the RPM Framework

RPM Outcome	RPM Driver	RPM Medium Level	Standard Criteria & Identifier	Standard Criteria & Identifier
Long-term System Resilience	Resistance management	Do you use pest management practices to protect or enhance natural biological controls to prevent development of resistance in pests, weeds and diseases?	Timing of planting, crop rotation or equipment cleaning to reduce pests	Practices used protect or enhance natural/biological pest controls
			PM-11	PM-27
	Information Use	Do you regularly review the long-term effectiveness of your pest management practices as they relate to the yield, quality, and cost of production for your crop?	Long-term effectiveness of practices reviewed	
			PM-26	
	Pest suppression	Do you use non-chemical crop management strategies to reduce pest populations over time?	Seed varieties selected for genetic protection from pests	Biological products used
			PM-9	PM-10
Environmental Stewardship	Non-target areas	Do you minimize negative impacts on sensitive areas, non-target organisms, and beneficial insects by using information aids?	Information used to minimize negative impacts on non-target areas and non-target organisms	
			PM-32	
	Targeted application methods	Do you limit applications to areas of the field where treatment is necessary?	Limit applications to areas of the field where treatment is necessary	
			PM-15	
	Off-target pesticide application exposure	Do you minimize off-target application exposure by utilizing real-time, field-level weather information to inform decisions?	Real-time, field-level weather information used	
			PM-25	
Optimal Production	Recordkeeping	Do you maintain field-level records of all pest management practices?	Maintain field-level records of all pest management practices	Pest management plan used
			PM-12	PM-27
	Yield, quality & supply chain	Do you optimize your pest management practices to improve profitable yield and quality over the past three or more years?	Practices optimized to improve profitable yield and quality over past 3+ years	
			PM-20	
	In-season information use	Do you use integrated pest management consultant(s), integrated pest management training, or use other resources such as university extension agents to assist	Use a Certified Crop Advisor (CCA), IPM consultants or University experts for pest monitoring and in season decisions	

RPM Outcome	RPM Driver	RPM Medium Level	Standard Criteria & Identifier	Standard Criteria & Identifier
		in pest monitoring and in-season decisions?	PM-1	
Human & Animal Health	Risk management	Do you regularly use a tool or resources that you have been trained on to provide comparative information about the health risk/hazard/nuisance issues associated with crop protection options?	Resources/tool used to get comparative information on pesticide options	
			PM-33	
	Worker and Neighbor protections	Do you have good neighbor, community, and worker communications to maintain and coordinate scheduling of activities or extra precautions?	Neighbor, community, and worker communications in place	
			PM-34	
	Pest-related health management	Are your farming activities designed to minimize the spread of pest related pathogens and chemical residues which pose a risk to human and/or animal health?	The farming, pest management, and harvest program is designed to prevent infection/spread by pests with human or animal health concerns.	
			HP-3	

High Level: Standard Criteria and Identifiers corresponding to the RPM Framework

RPM Outcome	RPM Driver	RPM High Level	Standard Criteria & Identifier
Long-term System Resilience	Resistance management	Do you regularly assess the efficacy of pest management practices by monitoring for resistance in pests before and after implementation?	Resistance to pests evaluated before and after implementation of a pest control practice
			PM-24
	Information Use	Do you collaborate in formal information and knowledge sharing initiatives that lead to improvements in pest management in your region?	Collaborate in information and knowledge sharing initiative(s)
			PM-31
	Pest suppression	Do you regularly monitor for invasive pests or other sources of pests that might present a problem for/from neighboring properties in the next season?	Pest monitoring from neighboring properties
			PM-23
Environmental Stewardship	Non-target areas	Does your pest management program benefit sensitive areas and/or non-target organisms, and beneficial insects?	Practices used benefit non-target areas and beneficial insects
			PM-28
	Targeted application methods	Do you continuously monitor for pests beyond your own farm to selectively target pests and prevent emerging pest	Pest monitoring beyond own farm to selectively target pests

RPM Outcome	RPM Driver	RPM High Level	Standard Criteria & Identifier
		problems?	PM-22
	Off-target pesticide application exposure	Do you use the best available technology to prevent off-target application exposure?	Technology used to prevent off-target applications (e.g., variable rate application technology, GPS guided field equipment, other)
			PM-30
Optimal Production	Recordkeeping	Do you analyze your pest management and production records annually to plan for the following years?	Records and analyses used to plan for following year
			PM-37
	Yield, quality & supply chain	Do you analyze your pest management practices to ensure consistency in meeting standards or specifications for your markets?	Practices analyzed to ensure market specifications or standards are met
			PM-21
	In-season information use	Do you combine the input from IPM consultant(s), your own scouting/trapping/imagery and follow regional surveys, models & alerts to make sure your pest control program is optimized for year-to-year challenges?	Information from scouting, imagery, surveys, models/alerts as well as experts used to optimize the pest control program
			PM-18
Human & Animal Health	Risk management	Do you use a tool or resources that provides comparative information about health risk/hazard/nuisance, regularly conduct risk and hazard assessments, and share this information with neighbors and supply chain actors?	Use tools/information on pest control options and share with others
			PM-36
	Worker and Neighbor protections	Do you act on feedback from neighbors, community, and workers to minimize potential for exposure to application activities (beyond label requirements) to improve comfort and convenience over time?	Act on feedback received to minimize potential for exposure to application activities
			PM-35
	Pest-related health management	Do you conduct additional residue and health risk testing according to specifications and share results with relevant stakeholders, including regulators or supply chain partners?	Conduct additional residue and health risk testing and/or audits according to specifications and share results with supply chain partners, and others.
			HP-4

Descriptions of RPM Framework Leadership Levels

Basic Level: Uses record keeping, a targeted approach, and optimizes outcomes on own farm.

Medium Level: Reviews records, analyzes and uses data to inform decisions, combines non-chemical methods into system on own farm.

High Level: Influences beyond own farm to areas and stakeholders that impact or are impacted by actions, learns and applies diverse methods, regularly monitors for success and impacts, reports and shares information.

Descriptions of RPM Framework Outcomes

Long-term System Resilience: Pest management favors long-term success through use of diversified practices/technologies which protect their longer-term utility in dynamic biological systems and leads to reductions in key pest populations over time.

Environmental Stewardship: Non-target organisms and areas are protected and/or improved in ways that go beyond regulatory requirements.

Optimal Production: The desired crops (or other output) are produced in the quantities and qualities needed to be financially viable and consistent with minimizing waste.

Human & Animal Health: Practices are protective of the health of individuals involved in pest management as well as human and animal consumers of crop or other output.

Descriptions of RPM Framework Drivers

Driver	Description
Information Use	The information and knowledge sources farmers use and the ways in which farmers apply information and knowledge to make sense of reductions in key pest populations over time.
Pest Suppression	The complex of activities farmers carry out to suppress pest population over time, or to reduce crop damage to an acceptable level
Non-target Areas	The complex of activities farmers carry out to protect all non-target organisms and plants growing outside fields, and those growing within fields that are not the intended pesticide target
Targeted Application Methods	The complex of activities farmers carry out to achieve precision targeted application of pesticides that reach their intended target organisms and plants growing inside fields, and those growing outside fields that are the intended pesticide target
Off-target Pesticide Application Exposure	The complex of activities farmers carry out to prevent off-target exposure from application of pesticides
Record-keeping	The complex of activities farmers carry out to keep and maintain records of all pest management activities and apply record-keeping to make sense of optimal production and reductions in key pest populations over time
Yield, Quality & Supply Chain	The complex of pest management activities farmers carry out to produce the desired crops (or other output) in the quantities and qualities needed to be financially viable and consistent with minimizing waste for all supply chain partners
In-season information use	The in-season information and knowledge sources farmers use and the ways in which farmers apply in-season information and knowledge to make sense of optimal production and reductions in key pest populations over time

Driver	Description
Risk Management	The complex of activities farmers carry out to identify, assess and control threats to health of individuals involved in pest management as well as neighbors and supply chain actors
Worker & Neighbor Protections	The complex of activities farmers carry out to inform, protect and minimize threats to health of workers involved in pest management as well as neighbors and communities
Pest-related Health Management	The complex of activities farmers carry out to prevent and minimize the spread of pest related pathogens and chemical residues which pose a risk to human and animal consumers of crop or other output

Appendix 2. Implementation of Roles for Management and Governance

Syngenta roles responsible for implementation of the four key roles for the management and governance of the Sustainable Outcomes in Agriculture Standard:

Role for Management of Standard	**Description**	**Syngenta Role Responsible for Implementation**
Single Owner	Overall accountability for the Standard.	Head of Sustainable & Responsible Business
Single Controls Manager	Manages maintenance of version types, quality assurance and results.	Senior Data Analyst for Digital Ag Solutions
Single Development Manager	Manages user feedback and ongoing enhancements.	Development Manager, Sustainable and Responsible Business
Customer Relations Manager(s)	Manages implementation including use agreements with value chain companies and producers	Sustainable Solutions Account Lead(s)

Appendix 3. Legal Language for Preservation of Integrity

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