

Sustainable investing

Agriculture 2022

All information in this report is as of December 31, 2022,
unless otherwise indicated. Report published September 2023.



Who we are

About Manulife Investment Management

Manulife Investment Management is the brand for the global wealth and asset management segment of Manulife Financial Corporation (Manulife). Our mission is to make decisions easier and lives better by empowering investors for a better tomorrow. Serving more than 17 million individuals, institutions, and retirement plan members, we believe our global reach, complementary businesses, and the strength of our parent company position us to help investors capitalize on today's emerging global trends. We provide our clients access to public and private investment solutions across equities, fixed income, multi-asset, alternative, and sustainability-linked strategies, such as natural capital, to help them make more informed financial decisions and achieve their investment objectives. Not all offerings are available in all jurisdictions. For additional information, please visit manulifeim.com.

Our natural capital business

Founded in 1985 and with our headquarters in Boston, Manulife Investment Management's timberland and agriculture businesses exist to create value through the sustainable management of natural resource investments. With over \$15.2 billion in assets under management, we're the world's largest natural capital investment manager,¹ and we're committed to investing sustainably across our global portfolio of agriculture and timberland assets.

Our agriculture investments

As of year-end 2022, our \$4.2 billion agriculture portfolio spans over 397,000 acres of prime farmland and farmland plus investments in the United States, Canada, Australia, and Chile. One hundred percent of our U.S. farmland portfolio is certified to an independent third-party farmland certification standard, and we're actively working on expanding certification across the rest of our global platform.² Our sustainable farming practices are part of active management that seeks to provide our clients with competitive economic returns while also maintaining and enhancing environmental and social benefits. Our vertical integration and in-house expertise in farmland management allow us to customize management activities to reflect the investment objectives of each client and the unique characteristics of each property.

¹ IPE research, as of February 5, 2023. Ranking is based on total natural capital assets under management (AUM), which includes forestry/timberland and agriculture/farmland AUM. Firms were asked to provide AUM, and the as of dates vary from December 31, 2021, to December 31, 2022. Assets shown in U.S. dollars.

² Certification as of June 2022, by Leading Harvest and is based on an annual assessment of the conformation to the Farmland Management Standard. Most current data shown. Please see leadingharvest.org.

A message from Oliver S. Williams IV, CFA

People often talk about an idea as if it were a seed that was planted. Ideas often take time to bear fruit—sometimes it's years before they produce anything of value. And then the flowers bloom.

Leading Harvest started in 2017 just like a seed, merely an idea for a sustainability standard for agriculture that could be applied across all crop types, geographies, and management systems. Five years later, our entire U.S. farmland portfolio once again achieved 100% certification under the Leading Harvest Farmland Management Standard, and we were among a core group to pilot it in Australia in 2022.² Leading Harvest is now an international organization. We're thrilled to have helped to plant the seed originally, and to champion its evolution into an independent third-party standard.¹ It hasn't been quick or easy, but it has certainly been worth the effort.

Another one of those seeds is regenerative agriculture, which has grown from relative obscurity (at least in the investment community) to become perhaps the most-discussed topic in agriculture investing today as consumers become more interested in where and how the products they consume are grown. Regenerative practices such as growing cover vegetation or using conservation tillage are those that focus on building soil health, recognizing that good soil is key to realizing both long-term financial returns and a good crop. Many understand these practices to be critical for capitalizing on agriculture's potential not only to feed the world, but to combat climate change, nature loss, and persistent social inequities.

I raise this because in 2022, we surveyed farm managers on every farmland asset we manage to see how widely these practices have already been deployed. Keep in mind, we don't mandate specific practices on our leased row crop properties, but we do aim to attract the highest quality tenants, and we seek to hire the best in the business to directly operate our permanent crop properties. So while it came as no surprise to learn that the proportion of farms using regenerative practices was significant, I was surprised at just how significant it was: Of our eligible 220 farms, 215 were using at least one regenerative practice—almost 98%—and over

92% were using three or more. Widespread adoption of regenerative agriculture practices supports a healthy farm ecosystem, which over the long term is essential for achieving sustainable financial returns.

All seeds need water to grow, and so do our investments. It's no secret that some of the world's most important agricultural regions have wrestled with drought, including California's Central Valley, home to many of the farms we manage (and our people who manage them). Those who follow that space closely are aware of California's Sustainable Groundwater Management Act and its intent to mitigate unsustainable extractions and protect groundwater basins in California. You'll also likely be familiar with the historic snowpack we've had this past winter, bringing most of the state out of historic drought.

Amid all of these changes, both physical and regulatory, we'll continue to invest in groundwater storage and recharge programs on our client properties, firmly focused on water stewardship and growing more crop per drop. We'll remain nimble in adapting to a rapidly shifting regulatory landscape and committed to providing world-class opportunities in key global agricultural investing regions for investors who want to grow food and fiber profitably and in a way that preserves the environment and contributes to the communities in which we operate.

Thank you as always for your business and for traveling on this sustainability journey with us. It's not without its twists and turns, but we're excited about the road ahead, and we hope you are too. Stay tuned for more specific material on our commitments to climate and nature—we look forward to sharing them with you.



Oliver S. Williams IV

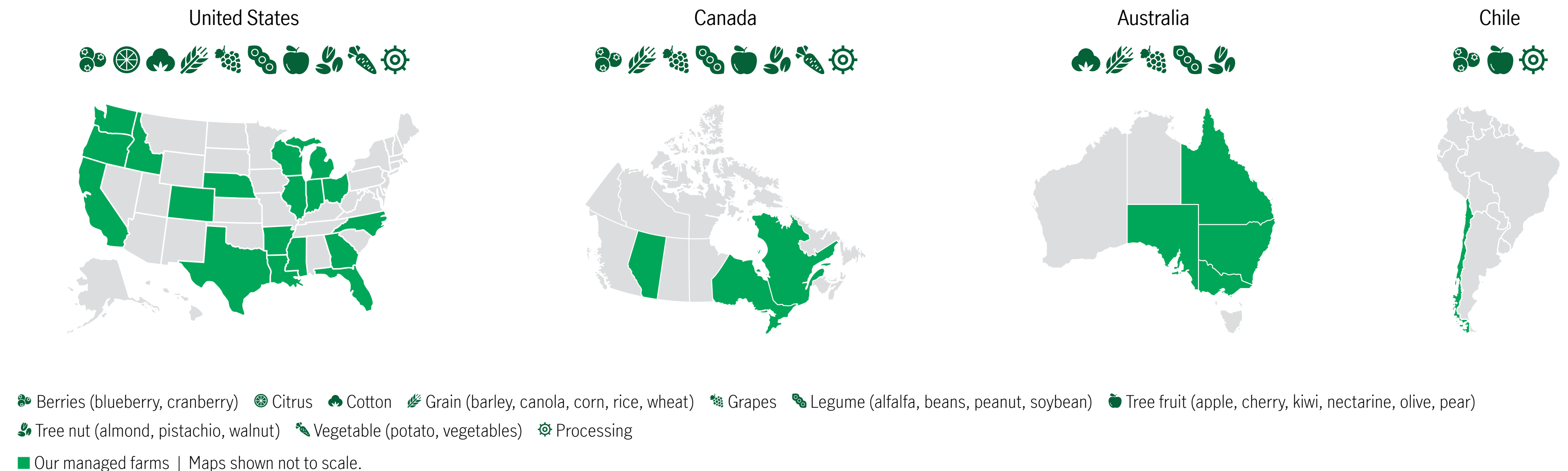
Oliver S. Williams IV, CFA

Global Head of Agriculture Investments, CIO

¹ Manulife Investment Management's timberland and agriculture team (then operating as Hancock Natural Resource Group) is a founding member of Leading Harvest. In addition, Oliver Williams, global head of agriculture, is current chair of the Board of Directors for Leading Harvest. For more information on Leading Harvest, please see leadingharvest.org/about.

Our approach

We manage farms and farmland plus investments around the globe in key institutional agriculture investment regions



Category	United States	Canada	Australia	Chile	Total
Assets under management (USD million)	\$3,344	\$196	\$528	\$117	\$4,185
Gross acres	284,413	23,202	87,695	2,570	397,880

Source: Manulife Investment Management, 2022.



Our foundational investment philosophy

Good stewardship is good business. Our clients' financial success directly depends on the health of our farms, and our vertically integrated global farmland management team—from portfolio managers to professional farm managers—gives us the ability to craft and execute long-term property management plans that promote soil health and resilience, which are intrinsic to generating financial returns. From our investment process to our property management, sustainability—managing assets today in such a way that they can continue providing benefits long into the future—is fundamental to our investment philosophy.

Our sustainability governance

Even the best sustainability strategies can lie on shaky ground without good governance, which is why our governance of sustainability is both deliberate and extensive. There are three key principles interwoven throughout our governance structure:

- 1 Integration within business verticals**
Integrating the sustainability team(s) with other relevant business verticals, including legal and regulatory, marketing and communications, risk management, and our operations team
- 2 Subject matter expertise**
Channeling the subject matter expertise of sustainability professionals embedded within our business units to inform larger whole-of-company sustainability decisions
- 3 Global resources**
Leveraging the resources of Manulife's global sustainability team to provide coherence to, and aid in the execution of, our sustainability strategy at an operational level

Our governance of sustainability

Manulife Manulife Investment Management



At the highest level, Manulife’s executive sustainability council, comprising C-suite representatives from across the company, including our global chief sustainability officer, makes decisions affecting the insurance and global wealth and asset management businesses globally. The council is informed by the work of various task forces, working groups, and centers of expertise, which are cross-functional collaborative efforts focused on knowledge sharing and strategy across sustainability themes, such as climate change, environmental, social, and governance (ESG) regulations, or responding to the EU's Sustainable Finance Disclosure Regulation (SFDR).



Within global wealth and asset management, our public markets and private markets businesses each have C-suite-level sustainable investing committees with policy and decision authority relevant to their respective businesses. Sustainability teams within each business vertical, and collectively led by a chief sustainability officer, advise the committees and develop and execute sustainability strategies for each asset class. In private markets, sustainability teams exist for agriculture and timberland, real estate and infrastructure, and private equity and credit.

Throughout our agriculture and timberland investment businesses, key sustainability decisions related to businesswide policy and commitments are taken by the private markets sustainable investing committee, with direction from the private markets chief sustainability officer and support from the agriculture and timberland sustainability team (within our agriculture business, a separate team of water professionals maintains close ties with the sustainability team). Sustainability decisions affecting individual areas of the business are taken collaboratively through the participation of sustainability team members in decision-making bodies (e.g., through investment committees or strategy working groups). The sustainability team provides due diligence tools to the agriculture acquisitions team, which uses these tools to prepare investment memos that are voted on by the agriculture investment and natural resource investment committees, which, in turn, may also consult the sustainability team for further input when relevant. Once the properties are brought into the portfolio, the sustainability team works alongside the portfolio managers and farm operations team to deliver returns consistent with our commitments.

Investment process



Sustainability in our investment process

Sustainability begins where we begin—when we evaluate new investment opportunities. In our investment process, since 2021 we’ve used a proprietary question-based tool co-developed in house by our sustainability, acquisitions, and operations teams to identify, assess, and score ESG components of every deal we consider.

This tool kit highlights both potential risks and opportunities, and it enables us to quantify risk through stoplight indicators used to rate inherent risk, risk mitigation potential, and residual risk. We then aggregate these upward to produce an overall numerical sustainability score for the asset, which can be used in our underwriting. The completed tool kit is provided in every deal package presented to our natural resource investment committee to ensure that investment decisions explicitly consider relevant sustainability risks and opportunities.

Together with our [deforestation policy](#), carbon principles, and carbon tool kit, this approach ensures we systematically consider all identified material sustainability factors (see panel at right) in our investment process.

Sustainable investing considerations

Climate

- Climate change impacts
- Emissions
- Deforestation
- CO₂ sequestration



Nature

- Sensitive lands
- Protected areas
- Biodiversity
- Threatened and endangered species
- Mitigation banking
- Water quantity/quality



People

- Health and safety
- Training and development
- Labor practices
- Human rights
- Community relations
- Indigenous peoples
- Job creation
- Research, internships



For illustrative purposes only.

Sustainability in our property management

While sustainability is integral to our due diligence, it doesn't stop there. It continues into our property management business where, as of year-end 2022, 100% of our U.S. farmland investments were certified under the Leading Harvest Farmland Management Standard,¹ and our Australian agriculture investments participated in a pilot program to launch the Leading Harvest Standard in Australia. Some assets are certified to additional agriculture standards on a case-by-case basis, including GLOBALG.A.P., USDA GAP, LODI RULES, and SAI-FSA. Overall, 223 of the 245 properties (91%, or approximately 80% of our agriculture AUM) in our global agriculture investment portfolio carried one or more third-party certifications. As Leading Harvest expands to other countries in which we operate, we also intend to seek certification in Australia, Canada, and Chile.

With the proliferation of ESG standards and regulations over the past few years, and in particular the advent of the European Union's sustainable finance taxonomy and SFDR, third-party certification continues to prove its relevance. Whether it's our three sustainability themes of climate, nature, and people or the three ESG themes of environmental, social, and governance issues, or the SFDR's Principal Adverse Impacts (PAIs), we believe that sustainable agriculture certification is a comprehensive mechanism for credibly demonstrating sustainable property management and, critically, it provides independent assurance to our investors, supply chain partners and consumers of our sustainability practices.

Program principles for Leading Harvest are shown in the panel at right, and the following page illustrates how these principles are aligned with the UN Sustainable Development Goals (SDGs), the SFDR's principal adverse impact indicators, and more general sustainability themes in the broader market (e.g., environment, social, and governance) or in our own sustainability strategy (e.g., climate, nature, people).

¹ Certification as of June 2022, by Leading Harvest and is based on an annual assessment of the conformation to the Farmland Management Standard. Most current data shown. Please see leadingharvest.org.

Certification

Leading Harvest principles

- 1** Sustainable agriculture
- 2** Soil health and conservation
- 3** Protection of water resources
- 4** Protection of crops
- 5** Energy use, air quality, and climate change
- 6** Waste and material management
- 7** Conservation of biodiversity
- 8** Protection of special sites
- 9** Local communities
- 10** Employees and farm labor
- 11** Legal and regulatory compliance
- 12** Management review and continual improvement
- 13** Tenant-operated operations



Crosswalk of certification principles and sustainability themes with SFDR PAIs

MIM themes ESG themes

	Climate	Nature	People	People
	Environment	Environment	Social	Governance
LH certification principles	LH 2—Soil health and conservation	LH 3—Protection of water resources	LH 8—Protection of special sites	LH 11—Legal and regulatory compliance
	LH 5—Energy use, air quality, and climate change	LH 4—Protection of crops	LH 9—Local communities	LH 12—Management review and continual improvement
		LH 6—Waste and material management	LH 10—Employees and farm labor	LH 13—Tenant-operated operations
		LH 7—Conservation of biodiversity		
Applicable SFDR PAIs (Table number.PAI)	1.1—Greenhouse gas (GHG) emissions	1.7—Activities negatively affecting biodiversity-sensitive areas	3.2—Rate of accidents	1.16—Investee countries subject to social violations
		2.8—Exposure to areas of high water stress		2.11—Investments in companies without sustainable land practices
		2.15—Deforestation		
UN SDGs	SDG 13—Climate action	SDG 6—Clean water and sanitation	SDG 2—Zero hunger	SDG 16—Peace, justice and strong institutions
		SDG 15—Life on land	SDG 11—Sustainable cities and communities	
			SDG 12—Responsible consumption and production	

Source: Manulife Investment Management (MIM). LH principles, SFDR PAIs, and UN SDGs.



Climate

Our approach to climate

We take climate change seriously, as it presents material risks—and opportunities—for our agriculture investments. Our goal is to mitigate the risks to the extent we're able, adapt to the risks that cannot be fully mitigated, and realize as many of the opportunities as we can.

Risks—More specifically, relevant climate-related risk factors include hurricanes, floods, hail, wildfires, droughts, early or late freezes, and pest and disease outbreaks. Well-managed farms are more resilient farms, and so our farm managers focus on maintaining and enhancing soil health. Good management is critical for protecting against losses related to these hazards, which are projected to grow in frequency and magnitude as climate change intensifies.

Opportunities—On the positive side, investments in agriculture can help mitigate climate change due to the way soils can remove planet warming CO₂ from the atmosphere. In addition, climate change may also benefit farmland investments in some geographies through longer growing seasons that may expand the range of viability for certain crops. While carbon credits may offer the potential for future monetization of sequestration benefits, in our view, the primary benefit of sequestration is soil health.

Scenario analysis—Finally, we recognize that despite these risks and opportunities, the actual impacts of climate change are far from certain. That's why we do our best to plan for multiple possible futures through climate scenario analysis. In 2022, we acquired a tool that will enable us to conduct scenario analysis across our entire global portfolio, which we look forward to completing and updating over time.

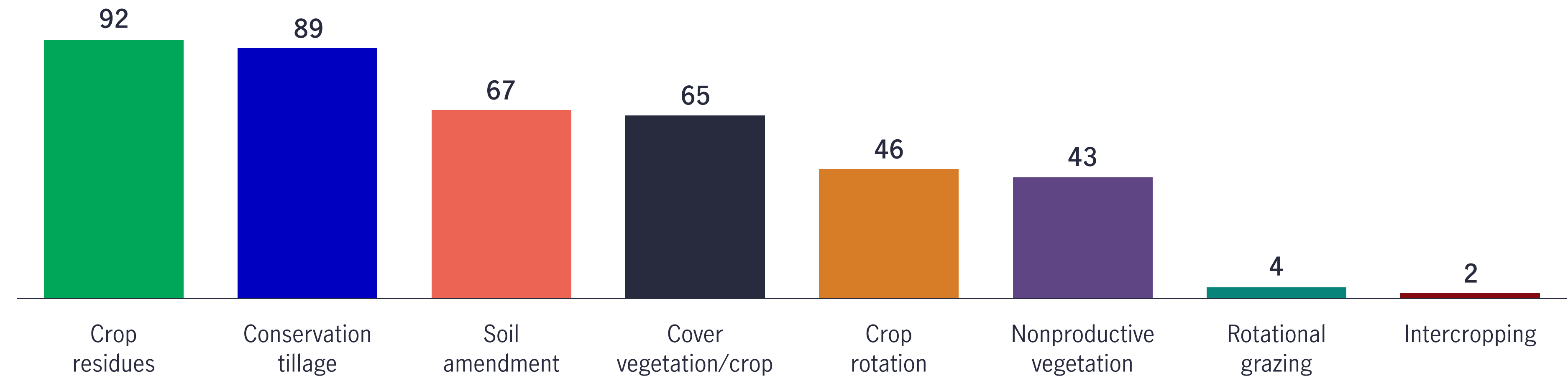
Adapting agriculture to a changing climate

With a growing world population and global demand for food increasing with it—combined with a need to preserve and rehabilitate important ecosystems while reducing GHG emissions and increasing carbon sequestration—the agriculture sector needs to provide multiple benefits: It needs to produce food profitably and sustainably while contributing to climate change mitigation and remaining resilient to changeable and sometimes extreme climate conditions.

Sustainable, modern agriculture best practices such as crop diversification and/or rotation, strategic chemistry deployment, improved crop genetics, cold storage, water banking, and crop insurance can help mitigate risk and accomplish these objectives. These are in addition to regenerative practices such as conservation tillage, cover vegetation, incorporation of crop residues, or adding soil amendments. Our farm managers are skilled at determining which of these adaptation methods are most beneficial in different situations, enabling us to mitigate climate risks in our agriculture investments.

Regenerative agriculture 2022

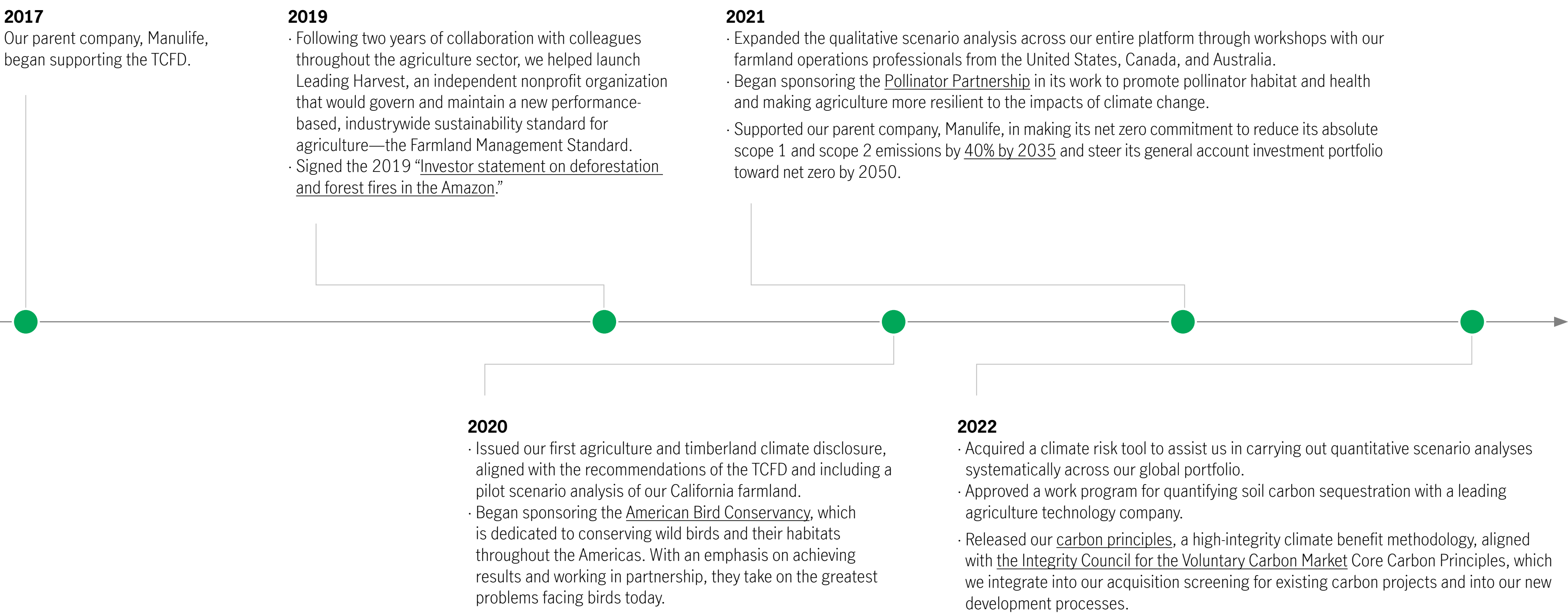
Percentage of properties using these methods of regenerative practices



Source: Manulife Investment Management, 2022. The statistics shown represent 90% of properties within the 2022 agriculture portfolio. Statistics do not include properties belonging to any of the following categories: properties under management for less than the full 2022 calendar year; properties not in operation during the 2022 calendar year; properties managed by third parties other than tenants (e.g., management companies); and farmland plus assets. Data was gathered in late 2022 and early 2023. Note that depending on geographic location and crop(s) being grown, some practices may not be practical to implement on some properties.

Our response to climate change over time

While we’ve always managed our agricultural investments adaptively to changing conditions, in the past few years we’ve adopted an increasingly explicit focus on responding to climate change. Since becoming a supporter of the [Task Force on Climate-related Financial Disclosures](#) (TCFD) in 2017, we’ve significantly scaled up our internal efforts and external partnerships focused on mitigating and adapting to climate change.



Manulife has developed targets in accordance with the methodology for financial institutions outlined by the SBTi, in combination with Partnership for Carbon Accounting Financials (PCAF) methodologies for emissions accounting.



Case study—ecosystem services market consortium for Southern cotton farmers

Regenerative practices such as cover cropping or incorporating soil amendments can improve soil health and contribute to climate change mitigation (through soil carbon sequestration) and climate change adaptation (e.g., through resilience to drought and pests). However, these practices may also carry significant up-front costs.

Last year, we joined the [Ecosystem Services Market Consortium \(ESMC\)](#) and partnered with ESMC as well as the U.S. Cotton Trust Protocol and Forum for the Future to launch the [Eco-Harvest pilot project](#) in Alabama, Arkansas, Texas, and Tennessee. The project will work with cotton farmers (including some of our own tenants) to generate high-quality carbon credits sought by corporate buyers. By providing training, information, and financial support through the generation of soil carbon credits, we can help our tenants incorporate more of the regenerative practices needed if the agriculture sector is to contribute to climate change mitigation and adaptation to its full potential.



Case study—Ranch 44 biochar trials

One of the more promising developments in sustainable agriculture is the growing recognition of the possibilities offered by biochar. Biochar is a charcoal-like material made by burning biomass such as agricultural waste in an oxygen-poor environment, a process known as pyrolysis. Biochar's unique properties—high porosity and a negative charge that can attract and hold on to nutrients and/or water—can make it a beneficial soil additive.

At Ranch 44, a cherry orchard in Washington state, we're mixing biochar with manure and incorporating it into the soil in the root zone of our trees. Mixing the biochar with the compost charges it, allowing it to bind with the microorganisms and nutrients in the compost and thereby protecting them in the microscopic pores of the biochar from inhospitable temperatures and environmental fluctuations until the plants can actively use them. The aim is to increase the health of the soil and, in turn, the overall health of the plant, resulting in a more sustainable farming practice and reduced cost per unit produced.



Metrics

We aim for continuous improvement in both environmental performance and in data quality, so some year-over-year fluctuations may be due to improved data quality (more primary data and fewer estimates) and should not yet be fully relied on to indicate decarbonization (or increasing emissions). We believe that 2022 data are of high enough quality (approximately 61% are primary data) that changes in future year performance can be reasonably attributed to actual changes in emissions and sequestration.

Metric	2022	2021	GIIN
Properties managed	263 ¹	269	OI1674
Scope 1 GHG emissions (tCO ₂ e) ²	33,131	47,072	OI4112
of which: fertilizer, urea, and lime emissions (tCO ₂ e)	12,469	20,073	OI4112
of which: fuel combustion emissions (tCO ₂ e)	17,724	26,999	OI4112
Scope 2 GHG emissions (tCO ₂ e) ²	18,935	17,922	OI9604
Scope 3 GHG emissions (tCO ₂ e) ²	193,092	195,684	PD9427
Biogenic removals (tCO ₂) ³	329,853	293,046	PI9878
Net sequestration (tCO ₂ ; +ve = sequestration; -ve = emissions)	84,681	32,368	PI9878
Number of crop types grown	24	25	N/A
Percent net productive area	87%	88%	N/A

Source: Manulife Investment Management, 2022. GIIN refers to Global Impact Investing Network [IRIS+](#) metric codes.

1 263 properties under management, as of December 31, 2022. Reference to 220 farms on page 3 excludes 43 properties belonging to one or more of the following categories: properties under management for less than the full 2022 calendar year; properties not in operation during the 2022 calendar year; properties managed by third parties other than tenants (e.g., management companies); and farmland plus assets.

2 Scope 1: According to the [GHG Protocol](#), scope 1 emissions are all direct GHG emissions, which are “emissions from sources that are owned or controlled by the reporting entity.” Scope 2: According to the [GHG Protocol](#), scope 2 emissions are “indirect GHG emissions from consumption of purchased electricity, heat or steam.” Scope 3: According to the [GHG Protocol](#), scope 3 emissions are “other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. T&D losses) not covered in Scope 2, outsourced activities, waste disposal, etc.” **3** Estimated soil carbon sequestration over the reporting period (calendar year 2022), using publicly available crop-specific soil carbon sequestration rates.

Targets

In 2021, our agriculture investment business set four short-term targets for the steps we need to take now in order for Manulife to accomplish its net zero targets. The following provides brief updates on our progress against these targets in the reporting year.

Short-term target (set 2021)	2022 progress	Status (year-end 2022)
Improve GHG quantification methods	We piloted the GHG Protocol <i>Land Sector and Removals Guidance</i> draft, greatly improved the proportion of primary data feeding into our GHG inventory, and green-lighted a project to quantify our soil carbon sequestration.	In progress
Launch our decarbonization strategy	We held a workshop with our North American operations leadership to discuss equipment and technology options for decarbonization and routes to implementation.	In progress
Scale regenerative agriculture	We surveyed property managers on all our agriculture properties to understand which regenerative practices they use (almost 98% use at least one regenerative practice, and the majority of farms use three or more).	In progress
Systematically understand climate risk	We contracted with a third-party climate risk data provider that will allow us to systematically analyze climate risk for all agriculture assets under management, as well as potential acquisition opportunities.	In progress

Source: Manulife Investment Management, 2022.

Nature

Our approach to nature

We view nature as our business. The farms we manage are ecosystems, and our job is to keep them healthy and productive over the long term. In a phrase, we want our management of agriculture investments to be nature positive. We aim to manage our agriculture investments so that they contribute to a nature-positive future. According to naturepositive.org, nature positive means halting and reversing nature loss at a planetary level so that:

- From 2020 onward, there's zero net loss of nature, as measured in terms of “the health, abundance, diversity, and resilience of species, populations, and ecosystems.”
- By 2030, nature is “on the path to recovery,” with human activity benefiting nature rather than depleting it.
- By 2050, nature is fully recovered, with “thriving ecosystems and nature-based solutions continue to support future generations, the diversity of life, and play a critical role in halting runaway climate change.”

What that means in practice can be challenging to determine given the plethora of frameworks and initiatives that have evolved to spur companies toward action on nature (in collaboration with the Delphi Group, we produced a guide to these: the “[Nature-positive ecosystem](#)”).

Key nature concepts

Nature is, quite simply, the natural world. It includes both abiotic (land, soil, water, air) and biotic realms. The biotic realm comprises ecosystems, species, and genes, which we refer to collectively as biodiversity.

Biodiversity is the variety of life on earth—typically a measure of the variation at the genetic, species, and ecosystem levels.

Natural capital is a way of referring to nature as a form of wealth with productive capacities that underpin value to society. All living things—our woodland, freshwater, farmland, coastal areas, oceans—are natural capital assets because they provide the services that make life possible. Biodiversity is a characteristic of healthy natural capital assets, and it underpins nature's capacity to generate flows of ecosystem services.

Natural capital accounting seeks to quantify (through traditional financial reporting methodology) the extent to which a company is contributing to, or detracting from, the natural capital assets under its management, as well as the extent to which such contributions may positively or negatively affect both the asset owner and society in general.

Toward nature positive: using the mitigation hierarchy

Principle	Definition	Our planned approach
Avoid	Avoid impacts on nature	<ul style="list-style-type: none">• Following our deforestation policy• Growing native vegetation on field margins
Reduce	When it's not possible to avoid impacts, minimize them	<ul style="list-style-type: none">• Developing species management plans to minimize the impact on and preserve habitat for threatened and endangered species• Optimize use of synthetically produced inputs
Restore	Restore affected ecosystems to their preimpacted state	<ul style="list-style-type: none">• Maintain and enhance soil health• Constructing groundwater recharge basins
Regenerate	Enable these ecosystems to regenerate themselves	Practicing regenerative farming through cover cropping, reduced tillage, compost application, and other techniques, as relevant
Transform	Contribute to systemwide change	Pilot natural capital accounting

Our approach may vary from time to time depending on the characteristics of the properties.



While there are many potential avenues for the agriculture sector to contribute to a nature-positive future, at its heart, nature action is rooted in the mitigation hierarchy.

Toward nature positive: natural capital accounting

One tool we believe to be invaluable for tracking progress on halting and reversing nature loss—as well as for informing decisions that will make this possible—it’s natural capital accounting. And it’s a key component of our approach to nature.

In 2022, we worked with a specialist global consultancy in environmental economics to pilot a natural capital accounting approach for our timberland investments. The approach entails construction of a natural capital asset register and materiality assessment, followed by valuation of natural capital assets and liabilities, using a combination of internal company data and publicly available research.

This approach culminates in a natural capital balance sheet and income statement, which, together, enables quantitative conclusions to be drawn about the extent to which a company is contributing to, or detracting from, the natural capital assets under its management, as well as the extent to which such contributions may positively or negatively affect both the asset owner and society in general.

We analyzed two pilot properties in 2022, and we plan to expand this approach across our agriculture and timberland portfolio in 2023 and beyond.



Case study—water banking in California

California’s Sustainable Groundwater Management Act (SGMA) was enacted in 2014 to mitigate unsustainable extractions and protect groundwater basins in California. We support the principles of the SGMA and its implementation, working cooperatively toward the long-term sustainability of our clients' assets and the communities and ecosystems in which we operate.

We’ve proactively incorporated the SGMA into our investment planning and operational decisions and will continue to do so as more information is released and approved by state authorities. One example of our proactive approach is Volos Ranch, a tree nut orchard in Tulare County, California. Volos Ranch sits within the Tule groundwater subbasin, which has been identified under the SGMA as critically overdrafted.

In coordination with Lower Tule River ID Groundwater Sustainability Agency (GSA), our approach at Volos Ranch is to implement groundwater recharge as a key part of our asset operating plan. Groundwater recharge involves capturing precipitation that falls on the property or excess floodwater, applying this water to groundwater recharge ponds, which in turn percolates into the ground replenishing the aquifer.

By coordinating with Lower Tule River ID GSA to implement groundwater recharge into our operations, we can more sustainably manage the supply of water for the asset, improve groundwater quality around the asset, and importantly play our part to achieve sustainable outcomes for the subbasin at large.



Case study—planting for pollinators in Wisconsin

Many species of birds, bees, bats, and butterflies are pollinators that we depend on for growing food crops. It's troubling that pollinator numbers have declined for decades due to pressures such as a changing climate, exposure to pests and disease, contact with poisonous chemicals, and reduction in their habitats.

On several of our Wisconsin cranberry marshes, our farm managers have taken improving local pollinator community welfare into their own hands. In Jackson Perry Creek marsh, we've built multiple pollinator gardens—both to ensure the sustainability of the cranberry crop and to steward native pollinators that will benefit the local community. We've also been scouting, researching, and photo-documenting the local flowering plant species with the aim of refining a proprietary, cranberry-specific pollinator blend suited to existing pollinators year-round in central Wisconsin's dry sandy soil. Based on information from the [Xerces Society for Invertebrate Conservation](#), our farm managers planted a small experimental plot of milkweed, the preferred food source for Monarch butterflies, in our Juneau Yellow River marsh. If successful, the plan is to plant an additional six to eight plots in various areas around the cranberry marsh.

It's still too early to know how successful the pollinator gardens and milkweed plots will be in their current form, but we believe that our experimental approach, informed by relevant external expertise, will help us to identify the solutions we're seeking.



Metrics

Measuring an organization’s contributions to or effects on nature is challenging, and there are a wide variety of tools being developed in concert with the Taskforce on Nature-related Financial Disclosures (TNFD) that will help to address this challenge. We’re following and, in some cases, contributing to these developments. In the meantime, we believe the most straightforward approach is to quantify the extent of our practices to conserve nature.

Metric	2022	2021	GIIN
Farms third-party certified as sustainably managed ¹	91%	78%	PI1679
Farms with farm management plan	100%	100%	OI2622
Farms with soil health practices ²	98%	55%	OD0660
Farms with biodiversity assessment	100%	100%	PD9009
Number of acres of pollinator habitat	295	295	PD9009
Number of stream miles protected by best management practices ³	0.8K	0.6K	OD4108
Area using integrated pest management	100%	100%	PD8494
Investments accounting for water risk and opportunity	100%	100%	N/A
Number of crop types grown	24	25	N/A

Source: Manulife Investment Management, 2022. GIIN refers to Global Impact Investing Network [IRIS+](#) metric codes.

1 100% of U.S. farms are third-party certified sustainable. Certification as of June 2022, by Leading Harvest and is based on an annual assessment of the conformation to the Farmland Management Standard. Most current data shown. Please see [leadingharvest.org](#). **2** Includes farms employing one or more of the following practices: conservation tillage or no till; cover vegetation/crop; crop residues; crop rotation; intercropping; nonproductive vegetation; rotational grazing; and soil amendment. **3** Includes North America and Australia only.

Targets

Setting targets around nature is challenging because it requires good baseline data and the ability to measure things, such as biodiversity, that have historically been difficult to quantify. For this reason, our current nature targets are process oriented and focus on establishing the measurement protocols required for monitoring current state and progress.

Our nature targets

As signatories to the [Finance for Biodiversity Pledge](#), we’ve pledged to fulfill the five targets below by 2024 at the latest.

Nature targets (set 2021)	2022 progress	Status (year-end 2022)
Collaborate and share knowledge on assessment methodologies, metrics, targets, and financing approaches	In 2022, we launched our “ Nature-positive ecosystem ,” a practical guide to major initiatives focused on protecting and restoring nature.	Complete
Engage with companies and incorporate criteria for biodiversity in our ESG policies	Incorporating biodiversity into our ESG policies is directly relevant to our real assets investments. We have policies on biodiversity and deforestation, and we incorporate multiple biodiversity-related considerations into both investment due diligence and property management.	Complete
Assess the impact of our investments on biodiversity and identify drivers of its loss	We’re building a system of natural capital accounts across our global operations to capture, quantify, and potentially monetize the relationship between our operations and nature that will enable us to track how our agriculture operations affect biodiversity, land, and water.	In progress
Set and disclose science-based targets to increase positive and reduce negative effects on biodiversity	We’re engaged in multiple external work streams focused on applying emerging guidance from the TNFD and Science Based Targets for Nature, and we’ll leverage this work to inform our nature target-setting process.	In progress
Annual public reporting on the significant positive and negative contributions of our investments to global biodiversity goals	We publicly report on progress through our annual sustainable investing reports and in private regulatory disclosures to individual investors, where applicable.	Complete

As pledge signatories, we've taken these commitments, which are verbatim from the pledge, as our own, and will adapt them as needed. For example, because the investments we manage are real assets rather than companies, we could adapt "engaging with companies" to "engaging with value-chain partners," referring to contractors or purchasers of our products.

People

Our approach to people and communities

We value our people, employees, and contractors, and we work to ensure that we're offering not only safe and healthy working environments but the tools, training, and support they need to thrive. We're also committed to supporting and strengthening the local and indigenous communities in which we operate, offering rural employment opportunities, public access to certain areas of land we manage, and support for local causes, as the following detailed description of our approach to different issues illustrates.

Safety first—The most important thing we can do on the job every day is to ensure our people make it home safely. We have a strong safety culture and, compared against agriculture industry safety benchmarks, our safety record outperforms. Yet we recognize that we still have room to improve and that a culture of safety always outweighs safety statistics.

Rural employment—In addition to our approximately 270 global agriculture employees, more than 1,800 farmland contractors work on properties we manage around the world. In some smaller rural communities, the scale of our operations makes us a key contributor to local economic activity. We prefer to buy locally, and maintain a preferred vendor list. Our farm management teams also participate regularly in local volunteering and community benefit activities.

Tenants—While we typically directly operate our permanent crop farms, in the United States, we usually lease row crop farms to local tenants. We work with farmers who manage their capital strategically. Leasing land from us can be part of a capital plan that enables them to invest in equipment to farm larger areas and gain scale. In these cases, leasing farmland is mutually beneficial and provides a cost-effective method for these farmers to optimize their businesses.





DEI—In 2021, we established a private markets diversity, equity, and inclusion (DEI) council to develop a strategy for DEI across private asset classes. The council includes representation from all private asset classes with a broad coverage of our major geographies and has four work streams: DEI best practices and opportunities, education and initiatives, communications, and data and metrics. Through this activity, we’re seeking to create a culture that’s more inclusive, better engages every employee, and provides opportunities for advancement regardless of race, ethnicity, age, gender, sexual orientation, religion, ability, economic status, and other aspects of diversity.

Recreational access—While agriculture is a fairly intensive land use that doesn’t always allow for recreation, we do maintain recreational opportunities where possible. In the United States, we lease more than 81,000 acres of agriculture property for leisure use and maintain more than 150 acres of farm property in Wisconsin with open, unrestricted public access.

Human rights—We adhere to Manulife’s [global human rights statement](#), seeking to uphold human rights and affirming the UN’s “Guiding Principles on Business and Human Rights” as well as national legislation that seeks to eradicate modern slavery. We extend these priorities to our contracting relationships. We require vendors to:

- Comply with all applicable antislavery and human trafficking laws, statutes, regulations, and codes
- Implement due diligence procedures for subcontractors, suppliers, and other participants in the supply chain to ensure no slavery or human trafficking
- Respect the dignity and human rights of all workers and be committed to fair employment and labor practices
- Provide protections against workplace harassment, abuse, discrimination, and violence



Case study—community collaborations in Wisconsin and Washington

Manulife provides each employee with one paid volunteer day each year. Many employees volunteer, but some band together and take it to the next level, whether during official volunteering time or simply by being good community members and neighbors. Our Washington and Wisconsin farm management teams are two such groups. In 2022, they accomplished the following:

- The Price Cranberry Lake team helped its local high school with an auditorium renovation, saving the school district \$7,500. Our Yellow River team regularly mows the campgrounds for a local wildlife area.
- Our Jackson Crawford Creek team installed a culvert under a road to drain water away from campsites and hauled in infill to raise the campsites above flood levels.
- Our Washington team collaborated with a local high school's science, technology, engineering, and mathematics (STEM) program to produce raptor boxes that will be placed on properties throughout Central Washington. Working with students in courses on engineering, manufacturing, and robotics, we've helped custom-build kestrel and owl boxes that will be placed on the ranches to provide habitat, assist in rodent control, and help minimize the use of rodenticides.

Metrics

The table below documents our status and progress over time on core measures of our contributions to our people and our communities.

Metric	2022	2021	GIIN
Number of employees (agriculture) ¹	367	344	N/A
Number of employees (total) ²	947	972	OI8869
Number of contractors (estimated) ³	1,870	1,389	N/A
Percent women ⁴	29%	20%	OI2444
Percent racially and ethnically diverse individuals ⁵	14%	28%	OI3236
Percent of leadership women ⁶	15%	18%	OI1571
Percent of leadership racially and ethnically diverse ⁶	11%	14%	OI3862
Number of new hires ⁷	54	52	OI5479
Percent attrition ⁸	18%	12%	OI1638
Lost time injury frequency rate ⁹	5.2	20.8	OI3757
Percent employees responding to engagement survey ⁸	89%	96%	N/A
Percentile employee engagement survey score ⁸	60	57	N/A
Contributions to nonprofits ¹⁰	\$585K	\$649K	FP3774
Lands with public access (acres) ¹¹	81,456	70,837	N/A

Source: Manulife Investment Management, 2022.

1 Includes 93 (2021) and 119 (2022) employees with agriculture and timberland. **2** Includes 628 (2021) and 580 (2022) timberland-only employees. **3** Agriculture contractors only; full-time equivalent, not individuals. **4** Percent women calculated across timberland and agriculture. **5** Includes North America staff as voluntarily reported in Workday only. **6** Leadership includes all timberland and agriculture staff at the level of director or higher (including AVP, VP). **7** Includes 9 (2021) employees with agriculture and timberland responsibility. **8** Combined result for timberland and agriculture in 2022 Gallup employee engagement survey. **9** Incidents per 1 million hours; 2021 and 2022 are agriculture only. **10** Combined result for timberland and agriculture; does not include Australia timberland operations or South America operations. **11** Public access refers to access of any type, including by permit or unrestricted open public access.

Our DEI progress

We’re committed to building a culture within our workplace where everyone thrives. Our holistic approach to DEI requires integration of DEI initiatives into every facet of our business—from outreach to education to employee engagement surveys. We use the power of data to track our DEI progress and the efficacy of our programs. Below we outline the targets we’ve set as we work toward meeting our goals.

People targets (set 2021)	Status (year-end 2022)
Employee engagement	
Achieve top quartile employee engagement scores	60%
Diversity	
Increase racially and ethnically diverse representation within our North American leadership by 60% by 2025 relative to 2021 (leadership is defined as those at VP, AVP, and director levels, approximately 10% to 15% of the company with leadership responsibilities)	-11% ¹
Achieve a sector-specific talent pool of 20% racially and ethnically diverse hiring over the next four years (U.S. agricultural and natural resources bachelor’s degrees at 21% racially and ethnically diverse)	14%
Increase the share of women in leadership roles to at least 20% by 2025	15%

Source: Manulife Investment Management, 2022.

¹ -11% represents a decrease from 12% to 11% overall in the proportion of racially and ethnically diverse individuals within our North American leadership relative to 2021. The decrease from 12% to 11% is a -11% change.

The road ahead: financial materiality of nonfinancial factors

As this sustainable investing report for our agriculture business should make abundantly clear, environmental and social factors are frequently at the heart of questions around financial materiality. Even when they're not precisely quantifiable, these factors are necessary features of our investment due diligence and property management as we strive to maximize returns and help our clients achieve their financial and nonfinancial objectives.

If these factors weren't financially relevant for the success of our investments, we wouldn't need to address water scarcity in California agriculture. If soil carbon sequestration was only a way for us to feel good about ourselves, we wouldn't be participating in pilot projects that we hope will help develop more robust soil carbon markets where we can issue credits to boost our investors' returns—while also benefiting the environment.

Our approach requires us to consider all sources of investment risk and opportunity, including nonfinancial sources (such as climate change) that may have material financial effects on our portfolios. In fact, carrying out our fiduciary duty—while it is particular to each client—generally requires consideration of sustainability risks and opportunities, and we wouldn't be acting in the best interests of our clients if we ignored them. Taking care of the land we manage and the people we employ and being good neighbors in the communities in which we operate are foundational to managing our agriculture investments profitably.

We've earned and maintained our agriculture investors' trust since 1990, and that's one of the most—if not the most—important asset we possess. And we have every intention of continuously growing that trust, year after year, crop after crop, investment after investment. Not despite the challenges we meet, but by working actively to mitigate them. We feel good about that, and we hope you do too.



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It should not be assumed that any ESG or sustainability initiatives, standards, or metrics described herein will apply to each asset in which Manulife Investment Management invests or that any ESG or sustainability initiatives, standards, or metrics described have applied to any individual prior investment of Manulife Investment Management. There is no guarantee that any initiatives or anticipated developments described herein will ultimately be successful or achieve anticipated outcomes. Environmental, social and governance (ESG) factors are only some of many considerations that Manulife Investment Management takes into account when making investment decisions, and other considerations can be expected in certain circumstances to outweigh ESG considerations. Any ESG or sustainability initiatives described will be implemented with respect to a portfolio investment solely to the extent Manulife Investment Management determines such initiative is consistent with its broader investment goals. Individual portfolio management teams may hold different views and make different investment decisions for different clients, and views may change over time. Investors should always read the current investment services information or fund offering documents before deciding to select an investment manager or to invest in a fund.

The case study/ies shown here are for illustrative purposes only, do not represent all of the investments made, sold, or recommended for client accounts, and should not be considered an indication of the ESG integration, performance, or characteristics of any current or future Manulife Investment Management product or investment strategy.

Manulife Investment Management conducts many ESG engagements each year but does not engage on all issues or with all issuers in our portfolios. We also frequently conduct collaborative engagements in which we do not set the terms of engagement but lend our support in order to achieve a desired outcome. Where we own and operate physical assets, we seek to weave sustainability into our operational strategies and execution. The case studies shown are illustrative of different types of engagements across our in-house investment teams, asset classes and geographies in which we operate. While we conduct outcome-based engagements to enhance long term-financial value for our clients, we recognize that our engagements may not necessarily result in outcomes which are significant or quantifiable. In addition, we acknowledge that any observed outcomes may be attributable to factors and influences independent of our engagement activities. The case studies shown are a sampling across issues and geographies. Our approach to ESG investing and incorporation of ESG principles into the investment process differs by investment strategy and investment team. It should not be assumed that an investment in the company discussed herein was or will be profitable. Actual investments will vary and there is no guarantee that a particular fund or client account will hold the investments or reflect the characteristics identified herein. Please see our ESG policies for details.

We consider that the integration of sustainability risks in the decision-making process is an important element in determining long-term performance outcomes and is an effective risk mitigation technique. Our approach to sustainability provides a flexible framework that supports implementation across different asset classes and investment teams. While we believe that sustainable investing will lead to better long-term investment outcomes, there is no guarantee that sustainable investing will ensure better returns in the longer term. In particular, by limiting the range of investable assets through the exclusionary framework, positive screening and thematic investment, we may forego the opportunity to invest in an investment which we otherwise believe likely to outperform over time.

Investing involves risks, including the potential loss of principal. Financial markets are volatile and can fluctuate significantly in response to company, industry, political, regulatory, market, or economic developments. These risks are magnified for investments made in emerging markets. Currency risk is the risk that fluctuations in exchange rates may adversely affect the value of a portfolio's investments.

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