

**Independent Opinion  
on the Statements of  
Manulife Investment Management  
Timberland and Agriculture**

**Relative to Its  
Agricultural Greenhouse Gas Emissions  
Inventory for 2022**

Opinion Date: 2023-04-30



<b>To the Management of:</b>	Manulife Investment Management Timberland and Agriculture 197 Clarendon St., C-08-99 Boston MA 02116 USA
<b>Independent Verification Opinion of:</b>	Futurepast: Inc. 2111 Wilson Boulevard, Suite 700 Arlington, Virginia 22201 USA
<b>Subject Matter:</b>	2022 Agricultural GHG Inventory
<b>For the Period:</b>	January 1, 2022 – December 31, 2022

## Details Pertaining to the Statements

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### **Responsible Party, if Different from Addressee**

### **Statement of Responsibility:**

It was the responsibility of Manulife Investment Management Timberland and Agriculture (“Manulife”) to prepare its agricultural land management greenhouse gas (GHG) inventory statements in accordance with the WRI/WBCSD GHG Protocol Corporate Accounting and Reporting Standard. This responsibility includes designing, implementing and maintaining a data management system adequate for the preparation and fair presentation of the statements. Manulife is responsible for the fair presentation of its data and information and ensuring that these are free from material misstatements.

Based on the work we performed, it was the responsibility of Futurepast to express an opinion as to whether the agricultural land management GHG emissions as stated by Manulife were presented fairly in accordance with the agreed criteria.

## Intended User and Limitation of Liability

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### **Intended User:**

This report has been prepared for the management of Manulife for internal management purposes and for public disclosure.

**Limitation of Liability:** Manulife is solely responsible for the preparation and presentation of the information it has submitted to Futurepast for verification. Our role is limited to expressing a conclusion as to whether the greenhouse gas emissions as stated by Manulife are presented fairly in accordance with the WRI/WBCSD GHG Protocol Corporate Accounting and Reporting Standard. In doing so, we do not assume any duty, liability, or responsibility of Manulife or of any third party. Our duties in relation to the opinions expressed are owed solely to Manulife. As such, we do not accept any responsibility for any loss allegedly occasioned by any third party acting or refraining from action because of our expressed opinions.

## Details Pertaining to the Validation/Verification Body

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**Futurepast's Role:** Futurepast is an impartial third-party validation/verification body.

## Declaration of Impartiality

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**Evaluation of Actual or Potential Conflicts-of-Interest** Futurepast, and the verification team members and independent reviewer, have evaluated their potential for compromised impartiality and found no actual or potential threats to impartiality with respect to the performance of this engagement.

## Details Pertaining to the Verification Team and Independent Reviewer

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**Verification Team Leader:** This verification was led by Stephen Boles.

**Independent Reviewer:** This verification was independently reviewed by John Shideler.

## Details Pertaining to the [Verification/Validation]

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**Type(s) of Engagement:** This is a mixed engagement comprised of verification of historical information and agreed-upon procedures for statements relating to properties leased by Manulife to farmers.

Manulife’s reported Scope 1 and Scope 2 emissions are a result of farm management practices that occur on properties that are directly operated by Manulife. At these properties Manulife has operational control over the properties and has access to verifiable input data on the farm management practices and consumption of energy and fertilizers. Futurepast’s verification opinion applies to the Scope 1 and Scope 2 emissions from directly-operated properties.

Manulife’s reported Scope 3 emissions are a result of farm management practices that occur on properties that Manulife leases to operators. For many of these properties a verifiable set of input data is not available as methodological approaches have been applied by Manulife to estimate the farm management practices in the absence of property-specific input data. Futurepast has used agreed-upon-procedures for Manulife’s Scope 3 emissions. The results of Futurepast’s agreed-upon-procedures are presented in a separate report of factual findings.

**Objectives of the Verification:**

To provide limited assurance to Manulife’s management that there is no evidence that the GHG Statements made by Manulife with respect to its agricultural properties are not materially correct and are not in conformance with the stated criteria.

**Scope of the Verification:**

<p><b>Facilities, physical infrastructure, activities, technologies, and processes</b></p>	<p>GHG emissions from Manulife's network of agricultural properties (directly-operated and leased) in the USA, Canada, and Australia.</p> <p>Manulife’s agricultural businesses manage properties in the USA, Canada, and Australia. A wide range of crop types are farmed in the Manulife portfolio, including almonds, pistachios, rice, cotton, corn, soybeans, grapes, cranberries, and more.</p> <p>Note that the following GHG sources were removed from the inventory boundary for the 2022 reporting year as they were deemed by Manulife not to be relevant:</p> <ul style="list-style-type: none"> <li>• agriculture residue biomass combustion</li> <li>• fallow land and broadacre crop categories</li> </ul>
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<p><b>Greenhouse gas sources, sinks, and reservoirs</b></p>	<p><b>SCOPE 1 &amp; SCOPE 2 GHG SOURCES (from directly-operated properties):</b></p> <p><u>Scope 1:</u> Fuel combustion (stationary and mobile sources), nitrogen application from fertilizers, lime and urea applications (CO<sub>2</sub> only)</p> <p><u>Scope 2:</u> Electricity consumption</p> <p><b>SCOPE 3 SOURCES (from leased properties):</b></p> <ol style="list-style-type: none"> <li>1. All GHG sources listed above occurring on leased properties</li> <li>2. Methane (CH<sub>4</sub>) emissions from water management on leased rice properties</li> </ol>
<p><b>Types of greenhouse gases</b></p>	<p>Manulife’s GHG inventory calculates and reports CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O emissions.</p>
<p><b>Time period</b></p>	<p>January 1, 2022 – December 31, 2022</p>

**Level of Assurance:** Limited. NOTE: Verification activities applied in a limited level of assurance verification are less intensive in nature, timing, and extent than in a reasonable level of assurance verification.

**Threshold of Materiality:** 10%

**Verification Criteria:** Futurepast performed this in accordance with the requirements of ISO 14064-3:2019.

## Description of Work Performed

**Description of the Basis for Our Conclusions and Opinion**

Futurepast designed and executed analytical procedures and controls testing on a risk-based approach after reviewing Manulife’s reported GHG Statements. Futurepast performed the following assessments of information and data during the verification:

1. Assessment of the boundaries of Manulife’s agricultural GHG inventory.
2. Tracing of GHG calculations in the consolidated

statements to confirm the accuracy of reported values.

3. Review for accuracy of GHG emission factors and calculation methodologies.
4. Comparison to the prior year results of GHG emissions and key input data values (e.g. fuel consumption, nitrogen applications).
5. Assessment of the reasonableness of assumptions (including Manulife’s definition of non-relevant sources of GHG emissions).

The data reviewed were historical in nature.

## Summary of the Responsible Party’s Statements

Manulife’s 2022 GHG emissions from agricultural land management are presented in the table below “Ag GHG Emissions Calculator 2022 – For MFC.xls”):

GHG Emission Category	Metric Tonnes of CO <sub>2</sub> e			
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	TOTAL
SCOPE 1 (Direct GHG emissions)	20,456	36	12,639	<b>33,131</b>
SCOPE 2 (Indirect GHG emissions from imported energy)	15,106	25	39	<b>18,935*</b>
SCOPE 3 (see AUP) (Indirect GHG emissions from other sources)	39,036	70,023	79,044	<b>193,092*</b>
<b>TOTAL</b>	<b>74,598</b>	<b>70,084</b>	<b>91,722</b>	<b>245,159*</b>

\*total CO<sub>2</sub>e value does not equal sum of listed greenhouse gas totals due to a lack of specific component greenhouse gas information in Australian emission factors for imported electricity

## Limitations, If Any

None

## Modifications, If Any

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Manulife's GHG inventory did not fulfil all requirements for public disclosure listed in the GHG Protocol, Chapter 9, "Reporting GHG Emissions", including:

- Emissions data for all seven GHGs separately (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub>, NF<sub>3</sub>) in metric tonnes and in tonnes of CO<sub>2</sub> equivalent

## Conclusions

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Based on our evaluation of the evidence, nothing comes to our attention which causes us to believe:

- That Manulife's inventory report for the period from 01/01/2022 to 31/12/2022 is not materially correct and is not a fair representation of its GHG data and information, and
- That Manulife's inventory report for the period from 01/01/2022 to 31/12/2022 has not been prepared in accordance with the World Resources Institute/World Business Council for Sustainable Development's "The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard – Revised Edition" (March 2004) as amended in 2013 and 2015.

## Approvals

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**Verification Team Leader:**



Stephen Boles, 30 April 2023

**Independent Reviewer:**



John C. Shideler, 30 April 2023

## Signature

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**Verification/Validation Body:** Futurepast: Inc., Arlington, Virginia USA

**Opinion Issued:**

2023-04-30

