

4. Agriculture, Food, and Forest Products Group

The Agriculture, Food, and Forest Products Group includes, but is not limited to, industries listed in [Figure 13](#).

Climate-related risks and opportunities in this group largely emanate from GHG emissions and water and waste management driven by land use, production practices, and changing land-use patterns.⁵¹

The absolute and relative impacts of climate-related transition and physical risks will vary between producers and processors of food and fiber.

Producers, such as agriculture and forestry enterprises, will likely be

impacted financially to a somewhat greater degree by GHG and water risks (including extreme weather events and shifts in precipitation patterns) than processors. Agriculture and forest producers generate significant non-point GHG emissions, primarily through land-use practices and changes to them (e.g., grazing, soil tillage practices, conservation practices, feedlot practices, deforestation, or afforestation).⁵²

Processors, such as food, beverage, and fiber processors (e.g., paper), will likely be impacted relatively less by direct GHG emissions (Scope 1), but more by indirect GHG emissions (Scope 3) arising from their supply and distribution chains. Processors will also have a similar emphasis on water and waste risks and opportunities as compared with producers. Beverage production and paper production, for example, depend on access to significant water resources and, in the case of beverage production, high-quality water resources. Risks and opportunities around waste include residual materials such as paper and wood waste, waste water, and post-processing animal byproducts.

Assessing the impacts of climate-related risks and opportunities for the Agriculture, Food, and Forest Products Group involves a number of interactions and trade-offs among the climate-related aspects of land use, water, waste, carbon sequestration, biodiversity, and conservation, complicated by short-run competing goals around food security (e.g., maintaining production sufficient to meet the rising demand for food, fiber, fodder, and biofuels).

Policies and regulations around land use and conservation requirements, for example, may constrain or preclude certain uses of land and water resources (e.g., deforestation, riparian rights, tillable land). Such policies may lead to significant asset impairment if forest or agricultural lands cannot be used to produce food or fiber.

Opportunities in the Agriculture, Food, and Forest Products Group largely fall into three categories:



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⁵¹ According to the Inter-Governmental Panel on Climate Change (IPCC), agriculture and forestry is responsible for “just under a quarter of anthropogenic GHG emissions mainly from deforestation and agricultural emissions from livestock, soil, and nutrient management. Anthropogenic forest degradation and biomass burning (forest fires and agricultural burning) also represent relevant contributions.” (IPCC. “Agriculture, Forestry and Other Land Use (AFOLU),” In: *Climate Change 2014: Mitigation of Climate Change*, 2014. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change). Agriculture is also a heavy user of water, primarily for irrigation.

⁵² For more information, see definitions of *land use change* and *indirect land use change* on page 1,265 of the IPCC’s [Climate Change 2014: Mitigation of Climate Change](#).

- Increasing efficiency by lowering the level of carbon and water intensity per unit of output (e.g., through drought-resistant hybrids, nutrient-efficient genetically modified organisms (GMOs), feed and feed practices that reduce livestock methane emissions).
- Reducing inputs and residual waste for a given level of output (e.g., nutrient management practices, tillage practices, conservation practices, biofuels, food waste reduction).
- Developing new products and services with lower carbon and water intensity (e.g., bioplastics).

Disclosures, therefore, should focus on qualitative and quantitative information related to both the group's policy and market risks in the areas of GHG emissions and water, and its opportunities around carbon sequestration, increasing food and fiber production, and reducing waste, including:

- Efforts to reduce GHG emissions and water intensity, including such non-point GHG sources as crop nutrient processes, livestock management processes, erosion, tillage practices, watershed practices, and forest management.
- Efforts to improve sustainability through better recycling of outputs and residual waste (e.g., wood products, food waste, and animal byproducts).
- Climate-related impacts on food and fiber production (e.g., extreme weather or water events).
- Opportunities that capture shifts in business and consumer trends toward food and fiber products, processes and services that produce lower emissions and are less water-/waste-intensive while maintaining adequate food security (e.g., bioplastics, GMOs, new uses for wood/animal byproducts).

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