Integrating Nature-Related Risk in the Finance Sector

Applying ENCORE to Storebrand Asset Management's activities

Results Summary –

Impacts and Dependencies analysis

Final Report

UN environment programme WCMC

1 Summary

Context

Storebrand Asset Management (hereafter referred to as 'Storebrand AM') approached UNEP-WCMC to seek support in understanding their exposure on nature-related risks. To identify their risks related to impacts and dependencies, Storebrand AM has requested UNEP-WCMC to conduct a high-level screening of direct nature-related risks for their portfolio of equity and bonds using ENCORE's knowledge base on direct nature-related impacts and dependencies[1].

This would help Storebrand AM in identifying activities within their portfolio that are at the highest potential risk from disruption to ecosystem services, and which pose a higher risk to nature due to their potential negative impacts. However, it is important to highlight that ENCORE provides information on direct material dependencies and impacts, not indirect ones, for further information, see 2 'Methodology and limitations'. Therefore, the present analysis is useful in terms of conducting a high-level screening of nature-related risks that can help Storebrand AM to understand nature related risks. Further steps are encouraged to gain greater detail on *actual* rather than *potential* nature related risks and opportunities for Storebrand AM (see section 'Implications and next steps for Storebrand AM').

The results of this assessment will contribute to increasing Storebrand AM's understanding of nature-related risks associated with its portfolio and how to address these through the recommended next steps. At the same time, the project provides UNEP-WCMC with an opportunity to test the applicability of ENCORE's impacts and dependencies database to an asset manager's portfolio of equity and bonds. Lessons learned from the project will support future developments of the ENCORE knowledge base.

The impacts analysis was conducted between mid-June and mid-July 2022, followed by the dependency analysis that was conducted between mid-July to mid-August. Given that it is a high-level analysis, the results provide an initial picture of potential impact and dependency related risk associated with Storebrand AM's portfolio. It shows how Storebrand AM's aggregate investments are potentially directly dependent on key ecosystem services and how they potentially impact nature. Further analysis is recommended in future in order to understand these impact and dependency related risks in greater detail.

This document provides the results of the impacts and dependencies analyses and the methodology used to conduct them.

[1] As previously discussed with Storebrand AM, the analysis does not capture indirect (value chain) impacts or dependencies.

Results

Impacts

As shown in Figure 1 below, 40% of Storebrand AM's portfolio[2] of equity and bonds is associated with either a High or Very High impact materiality rating[3] in ENCORE. Storebrand AM's highest exposure to impact-related risks stems from the solid waste impact driver[4] (see Figure 2). Please note that an impact driver is not equivalent to an impact[5]. This is primarily due to the large weight of Financials in the portfolio and the fact that Financials in ENCORE are only associated with solid waste as a direct material impact driver. As such, it should be noted that the impacts associated with the investments made by Financials in Storebrand AM's portfolio are not captured here given that the analysis solely focuses on direct impacts. However, it remains important to note that in the scenario when Financials are being excluded from the analysis, results still show that solid waste has the highest ranking among all the impact drivers[6]. Solid waste is followed by water pollutants, soil pollutants, water use and non-GHG air pollutants. Together, these are the most frequently occurring, highest materiality impact drivers. A description of these impact drivers is provided in Table 1, which can also be found together with other impacts drivers that are listed in ENCORE in Appendix '3.1 Impact drivers in ENCORE'.

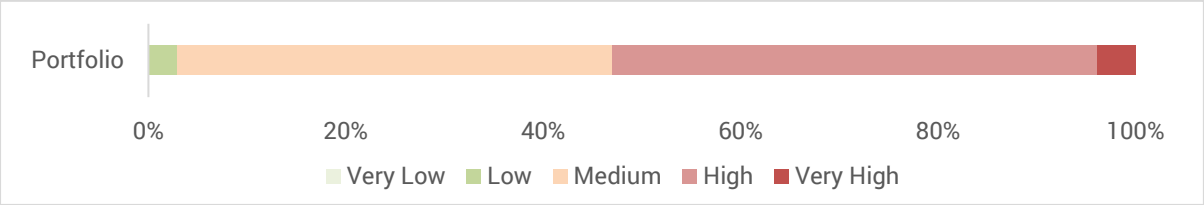


Figure 1. Percentage of the total portfolio associated with each materiality category (Very Low: 0%; Low: 2%; Medium: 58%; High: 36%; Very High: 4%).

Table 1. Most frequently occurring, highest materiality impact drivers for Storebrand AM and its description.

Most frequently occurring, highest materiality impact drivers	Description
Solid waste	Examples include volume of waste by classification (i.e., non-hazardous, hazardous, and radioactive), by specific material constituents (e.g., lead, plastic), or by disposal method (e.g., landfill, incineration, recycling, specialist processing).

[2] The total value of the assessed portfolio is NOK 901.6 billion. Excluded data are those that either 1) lack a GICS code; or 2) pertain to GICS codes not currently covered by ENCORE.
[3] To understand how this is calculated please refer to section '2.1 Methodology', 'Impacts analysis' sub-section.
[4] For the definition and types of impact drivers in ENCORE please refer to Appendix '3.1 Impact drivers in ENCORE'.
[5] An impact driver is different to an impact. While impact driver is defined as a measurable quantity of a natural resource that is used as an input to production or a measurable non-product output of business activity, impacts are "changes in the quantity or quality of natural capital that occurs as a consequence of an impact driver". For a more detail explanation please refer to Appendix '3.1 Impact drivers in ENCORE'.
[6] For a diagram showing the scenario in which Financials are excluded from the analysis, please refer to Appendix 3.5 Summary diagram of links between Storebrand AM's portfolio data, relevant GICS Sectors, and ENCORE impact drivers, with financials removed.

Water pollutants	Examples include volume discharged to receiving water body of nutrients (e.g., nitrates and phosphates) or other substances (e.g., heavy metals and chemicals).
Soil pollutants	Examples include volume of waste matter discharged and retained in soil over a given period.
Water use	Examples include volume of groundwater consumed, volume of surface water consumed, etc.
Non-GHG air pollutants	Examples include volume of fine particulate matter (PM2.5) and coarse particulate matter (PM10), Volatile Organic Compounds (VOCs), mono-nitrogen oxides (NO and NO2, commonly referred to as NOx), Sulphur dioxide (SO2), Carbon monoxide (CO), etc.

All negative impacts arising from business activities should be mitigated in the mid to long term. However, the process to shift away from negative impacts and towards positive impacts takes time. As such, Storebrand AM could consider prioritising their actions in addressing the above impact drivers.

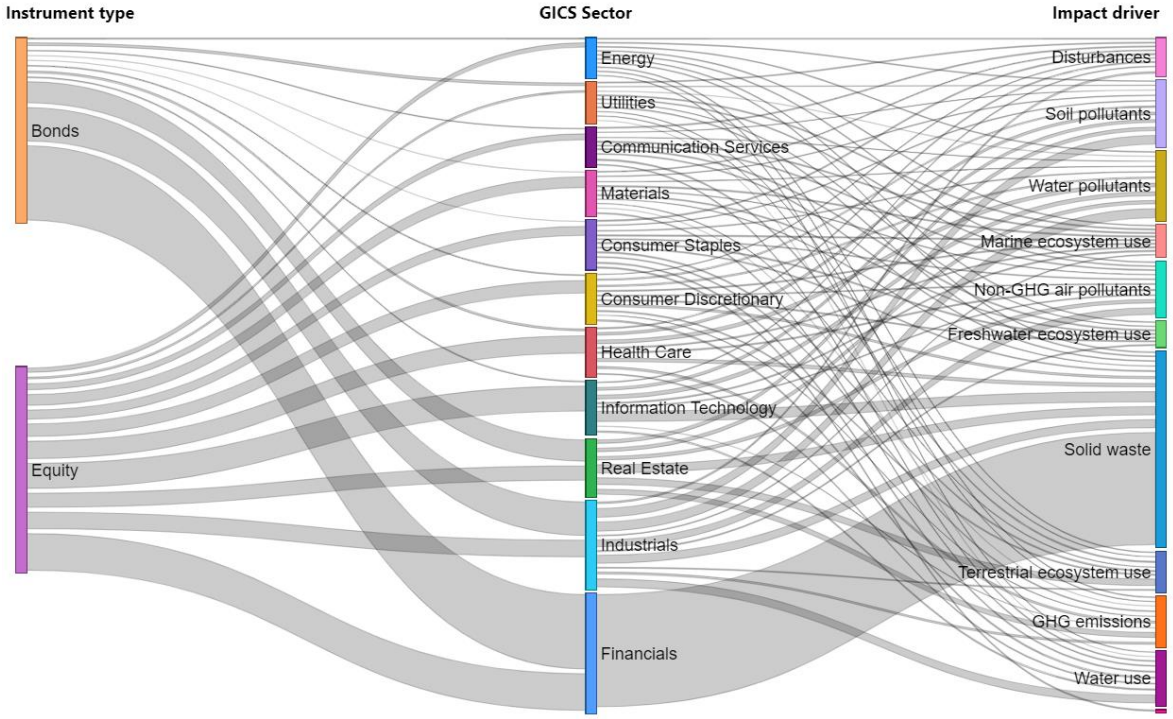


Figure 2. Summary diagram of links between Storebrand AM's portfolio data, relevant GICS Sectors, and ENCORE impact drivers. Flows are weighted by impact materiality ratings and NOK invested in each GICS Sector. The bottom-most impact driver is 'Other resource use'.

Using ENCORE's impacts knowledge base and Storebrand AM's portfolio data, it is also possible to identify the *sub-industries* with the most material nature-related impacts. Figure 2 combines the sub-industries' highest impact materiality ratings with the market value of that sub-industry in Storebrand AM's portfolio (see '2.1 Methodology' section for detail on 1) how these ratings were combined and 2) how ENCORE assigns each sector a series of impact drivers with different materiality ratings based on its assessment methodology). The resulting list is provided in Table 2 below. This list can serve as a starting point for Storebrand AM's next steps on nature (e.g., setting additional due diligence and

assessing the risk of individual sub-industries in detail). See also the 'Implications and next steps for Storebrand AM' sub-section below for further information on suggested next steps. To have a more detailed understanding of the materiality of different impact drivers that these 25 sub-industries link to, please refer to Appendix '3.3. Materiality of different impact drivers for the Top 25 sub-industries'.

Table 2. Top 25 sub-industries based on combined highest impact materiality ratings and amount invested in each sub-industry in NOK. Sub-industries were ranked based on the sum of materiality rating scores for each unique combination of impact driver and materiality rating. The column titled '% Share of Total Market Value' represents the percentage share of the market value of the sub-industry when compared to the total market value of the analysed portfolio.

Rank	Industry	Sub-industry	Combined ENCORE materiality rating	Associated market value (in Million NOK)	% Share of Total Market Value
1	Utilities	Electric Utilities	62	7,873	0.87
2	Industrials	Diversified Support Services	18	88,009	9.76
3	Utilities	Renewable Electricity	61	7,134	0.79
4	Real Estate	Real Estate Operating Companies	22	78,507	8.71
5	Utilities	Independent Power Producers & Energy Traders	62	3,241	0.36
6	Financials	Diversified Banks	3	108,650	12.05
7	Consumer Staples	Agricultural Products	56	1,277	0.14
8	Materials	Industrial Gases	55	1,623	0.18
9	Industrials	Construction & Engineering	49	3,205	0.36
10	Financials	Regional Banks	3	83,236	9.23
11	Energy	Integrated Oil & Gas	42	9,063	1.01
12	Energy	Oil & Gas Drilling	42	309	0.03
13	Energy	Oil & Gas Exploration & Production	40	3,524	0.39
14	Materials	Diversified Chemicals	40	832	0.09
15	Materials	Diversified Metals & Mining	38	2,511	0.28
16	Materials	Aluminum	38	2,138	0.24
17	Materials	Gold	38	2,017	0.22
18	Materials	Copper	38	693	0.08
19	Materials	Silver	38	517	0.06
20	Materials	Precious Metals & Minerals	38	419	0.05
21	Energy	Coal & Consumable Fuels	38	12	0.001
22	Industrials	Highways & Railtracks	35	2,924	0.32
23	Consumer Discretionary	Homebuilding	35	1,918	0.21
24	Materials	Construction Materials	35	929	0.10
25	Industrials	Marine Ports & Services	33	297	0.03

Dependencies

As shown in Figure 3 below, 11% of Storebrand AM's portfolio of equity and bonds is associated with either a High or Very High dependency materiality rating[7] in ENCORE. Storebrand AM's highest exposure to dependency related risks stems from the mass stabilisation and erosion control ecosystem service[8] (see Figure 4). This is followed by surface water, bio-remediation, ground water and flood and storm protection. A description of these ecosystem services is provided in Table 3, which can also be found together with other ecosystem services that are listed in ENCORE in Appendix '3.2 Ecosystem Services in ENCORE'.

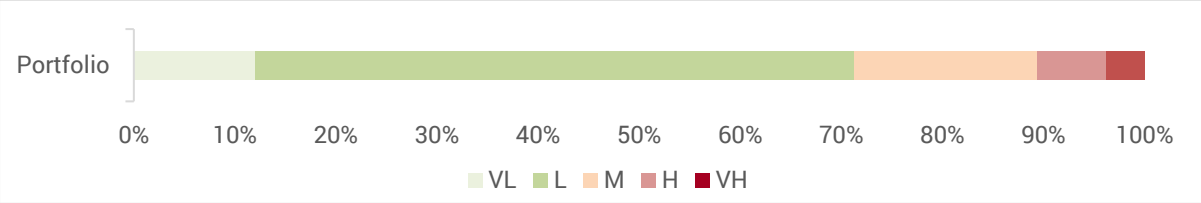


Figure 3. Percentage of the total portfolio associated with each materiality category (Very Low: 12%; Low: 59%; Medium: 18%; High: 7%; Very High: 4%)

Table 3. Most frequently occurring, highest materiality ecosystem services for Storebrand AM and its description.

Most frequently occurring, highest materiality ecosystem services	Description
Mass stabilisation and erosion control	Mass stabilisation and erosion control is delivered through vegetation cover protected and stabilising terrestrial, coastal and marine ecosystems, coastal wetlands and dunes. Vegetation on slopes also prevents avalanches and landslides, and mangroves, sea grass and macroalgae provide erosion protection of coasts and sediments.
Surface water	Surface water is provided through freshwater resources from collected precipitation and water flow from natural sources.
Bio-remediation	Bio-remediation is a natural process whereby living organisms such as micro-organisms, plants, algae, and some animals degrade, reduce, and/or detoxify contaminants.
Ground water	Groundwater is water stored underground in aquifers made of permeable rocks, soil and sand. The water that contributes to groundwater sources originates from rainfall, snow melts and water flow from natural freshwater resources.
Flood and storm protection	Flood and storm protection is provided by the sheltering, buffering and attenuating effects of natural and planted vegetation.

As with the impacts analysis, it should be noted that the dependencies associated with the investments or lending made by Financials in Storebrand AM's portfolio are not captured here given that the analysis solely focuses on direct dependencies. As such, there is a need to further understand

[7] To understand how this is calculated please refer to 'Section 2.1 Methodology' sub-section 'Dependencies analysis'.
[8] For the definition and types of ecosystem services in ENCORE please refer to the Appendix '3.2 Ecosystem services in ENCORE'.

what types of economic activities the Financials component of Storebrand AM's portfolio is investing in or lending to. However, it remains important to note that if Financials are excluded from the analysis, results still show that mass stabilisation and erosion control has the highest ranking among all the ecosystem services[9].

All the risks arising from business activities that have a high dependency on nature should be mitigated through positive actions for nature in the mid to long term to enable the continued provision of ecosystem services upon which they depend. However, the process to mitigate dependency related risks takes time. As such, Storebrand AM could consider prioritising their actions in addressing the ecosystem services that they are most dependent on (i.e., mass stabilisation and erosion control, surface water, bio-remediation, ground water, and flood and storm protection). This may include setting investment policies that allows dependency risks mitigation or using Nature-based Solutions as a way to support the provision of these ecosystem services.

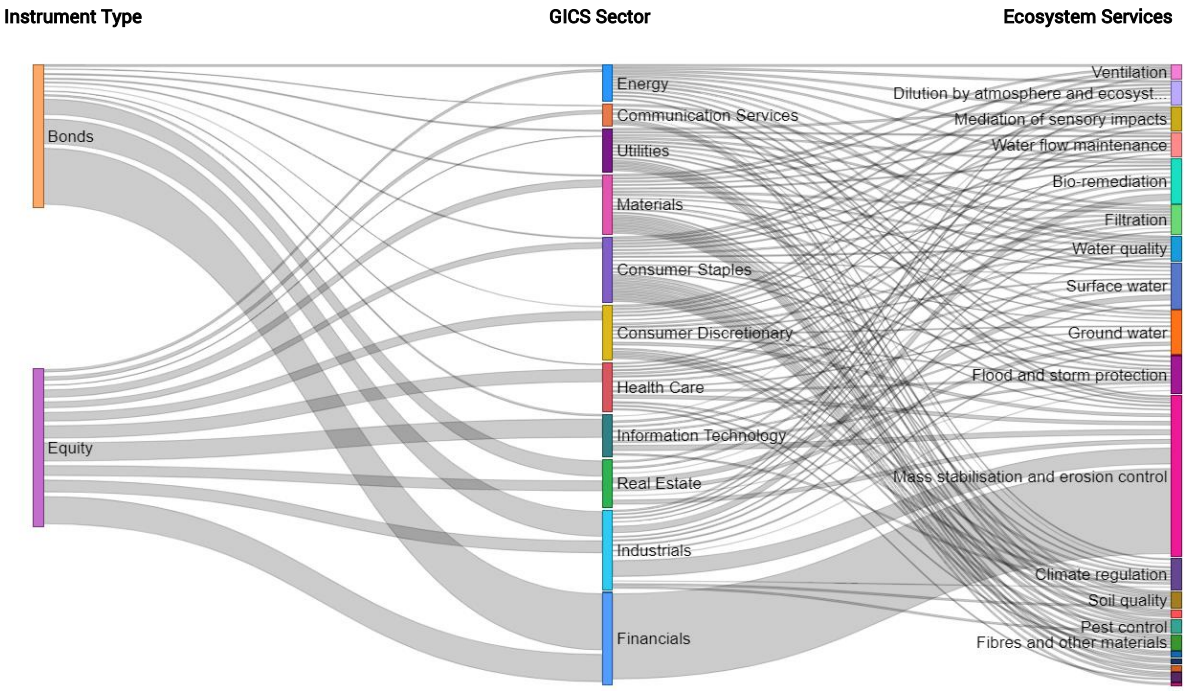


Figure 4. Summary diagram of links between Storebrand AM's portfolio data, relevant GICS Sectors, and ENCORE ecosystem services. Flows are weighted by dependency materiality ratings and NOK invested in each GICS Sector. The ecosystem services that are without labels are: buffering and attenuation of mass flows, animal-based energy, pollination, disease control, genetic materials, and maintenance of nursery habitats.

Using ENCORE's dependency knowledge base and Storebrand AM's portfolio data, it is also possible to identify the *sub-industries* with the most material nature-related dependencies. The approach in Figure 4 is the same as for identifying the sub-industries with the most material impacts. It is based on sub-industries' combined highest dependency materiality ratings and the market value in Storebrand AM's portfolio (see '2.1 Methodology' section for detail on 1) how these ratings were combined and 2) how ENCORE assigns each sector a series of ecosystem services with different materiality ratings based on its assessment methodology). The resulting list is provided in Table 4

[9] For a diagram showing the scenario in which Financials are excluded from the analysis, please refer to Appendix 3.6 Summary diagram of links between Storebrand AM's portfolio data, relevant GICS Sectors, and ENCORE ecosystem services, with financials removed.

below. This list can serve as a starting point for Storebrand AM's next steps on nature (e.g., setting additional due diligence and policies, assessing the risk of individual sub-industries in detail). See also the 'Implications and next steps for Storebrand AM' sub-section below for further information on suggested next steps. To have a more detailed understanding of the materiality of different ecosystem services that these 25 sub-industries depend on, please refer to Appendix '3.4 Materiality of different ecosystem services for the Top 25 sub-industries'.

Table 4. Top 25 sub-industries based on combined highest dependency materiality ratings and amount invested in each sub-industry in NOK. Sub-industries were ranked based on the sum of materiality rating scores for each unique combination of ecosystem services and materiality rating. The column on % Share of the market value represents the % share of the market value of the sub-industry when compared to the total market value of the analysed portfolio.

Rank	Industry	Sub-industry	Combined ENCORE materiality rating	Associated Market Value (in Million NOK)	% Share of Total Market Value
1	Consumer Staples	Agricultural Products	192	1,277	0.14
2	Financials	Diversified Banks	2	108,650	12.05
3	Industrials	Diversified Support Services	3	88,009	9.76
4	Real Estate	Real Estate Operating Companies	15	78,507	8.71
5	Financials	Regional Banks	2	83,236	9.23
6	Materials	Forest Products	87	1,115	0.12
7	Utilities	Renewable Electricity	57	7,134	0.79
8	Financials	Life & Health Insurance	2	37,519	4.16
9	Utilities	Electric Utilities	49	7,873	0.87
10	Consumer Staples	Packaged Foods & Meats	28	18,026	2.00
11	Utilities	Independent Power Producers & Energy Traders	49	3,241	0.36
12	Financials	Diversified Capital Markets	2	28,795	3.19
13	Materials	Industrial Gases	45	1,623	0.18
14	Industrials	Industrial Machinery	23	13,021	1.44
15	Utilities	Water Utilities	42	1,889	0.21
16	Energy	Integrated Oil & Gas	29	9,063	1.01
17	Real Estate	Real Estate Services	15	15,551	1.72
18	Consumer Discretionary	Apparel, Accessories & Luxury Goods	36	3,393	0.38
19	Consumer Discretionary	Automobile Manufacturers	23	9,824	1.09
20	Materials	Specialty Chemicals	33	3,820	0.42
21	Consumer Discretionary	Hotels, Resorts & Cruise Lines	35	1,209	0.13
22	Materials	Aluminum	33	2,138	0.24
23	Consumer Staples	Soft Drinks	28	4,631	0.51
24	Industrials	Highways & Railtracks	31	2,924	0.32
25	Health Care	Pharmaceuticals manufacturing	19	9,263	1.03

Implications and next steps for Storebrand AM

The analysis shows that there are significant potential impact and dependency related risks associated with Storebrand AM's portfolio. For the impact side, solid waste, water pollutants, soil pollutants, water use, non-GHG air pollutants, and GHG emissions have been identified as the major impact drivers for further consideration. For the dependency side, the analysis has identified mass stabilisation and erosion control, surface water, bio-remediation, ground water, and flood and storm protection as the major ecosystem services that Storebrand AM is dependent on. In order to effectively manage these nature related risks, it is recommended that Storebrand AM consider addressing the impacts drivers and ecosystem services listed above as a priority.

Concrete actions can be taken by Storebrand AM to better assess and eventually manage impact and dependency related risks. Two main actions are listed below.

- Having biodiversity specific ESG requirements to reduce nature related risks when the investment involves sub-industries that are listed in Table 2 and/or Table 4, or companies whose activities either 1) largely contribute towards the above-mentioned impact drivers; and/or 2) are dependent on the above-mentioned ecosystem services[10]. Storebrand AM could consider setting requirements in line with those provided in IFC PS3 'Resource Efficiency and Pollution Prevention' and IFC PS6 'Biodiversity Conservation and Sustainable Management of Living Natural Resources'. IFC's Performance Standards have been widely adopted by development finance and its principles can be applied to asset management, particularly if the asset managers undertakes active engagement with companies.
- Setting a specific biodiversity and ecosystem service policy at portfolio level with a focus on the sub-industries that are listed in Table 2 and Table 4.

Next Steps

When thinking about next steps based on the priority impact drivers, ecosystem services and the sub-industries outlined above, Storebrand AM may wish to consider the following next steps (broadly aligned with the Locate and Evaluate steps in the Beta framework of the Taskforce on Nature-related Financial Disclosures).

1. Gather more detailed data on Financials in the portfolio – Given the weight of Financials in Storebrand AM's portfolio, there is a need to understand what each financial institution is investing in. This will help to refine the assessment of priority impact drivers and ecosystem services. The easiest way to do so would be to obtain data on the breakdown of lending/investment of the financial institutions that Storebrand AM is investing in through ESG service providers. An alternative method would be to use any public/private datasets that trace transaction records between financial institutions and the companies they invest in or lend to. An example of this for deforestation-risk commodities can be found on the trase.finance platform. It is recommended that Storebrand AM take a prioritised approach to this by starting to look at the investment portfolio of the financial institutions that belong to the sub-industries group of diversified banks and regional banks, as these two groups are identified in the top 25 priority lists (i.e. those listed in Table 2 and Table 4).

[10] This can be identified at a high-level using Figure 4 and the ENCORE dependencies database.

2. Set targets – Targets can be set by Storebrand AM, forming periodic goal(s) to achieve in reducing the impact and dependency related risks associated with its investment portfolio. Nature-related target-setting is an evolving space, as such there are currently no tools that provide 'off-the-shelf' nature-related targets for financial institutions. However, Storebrand AM can consider engaging with bodies such as the Finance for Biodiversity Pledge and UNEP FI who are developing guidance on biodiversity target-setting for financial institutions. This will help identify and set suitable targets for Storebrand AM's portfolio, and most importantly decide the scope to work on based on these targets. Other relevant initiatives to follow and/or engage in include the Science Based Targets Network and the Taskforce on Nature-related Financial Disclosures. It may also be helpful to consider other ESG-related targets (e.g., climate-related targets), which can be combined with the nature-related targets to help Storebrand AM address multiple ESG issues at the same time.

3. Create a short list of non-financial companies to focus on – Based on the decided scope of the targets, Storebrand AM can then create a list of non-financial companies to focus on. While this document has recommended which sub-industries Storebrand AM should first prioritise its work on (Table 2 and Table 4), the number of companies that require Storebrand AM's engagement in these sub-industries remains large. To further narrow down the list, Storebrand AM can consider setting extra selection criteria based on factors such as the amount invested in a company, the size of the company, and/or the type of holding.

4. Collect and integrate data – After the creation of the shortlist, it would be necessary to collect relevant data to further understand the specific risks that companies are facing as well as their response measures. This would include:

> **I. Collecting location-specific, impact driver-specific and ecosystem service specific-data -** - It would be necessary to collect data to understand where these companies operate, the state of ecosystem services they depend on, and the pressures they are exerting on nature. This will support an assessment of their *actual* rather than potential nature-related risks.
>
> Data can be collected through direct requests on the targeted companies. If companies do not possess such information, obtaining data from ESG service providers would be an alternative as they often have data on the locations of companies' activities and either primary or secondary (modelled) data on the pressures companies are exerting on nature. Obtaining data on the state of ecosystem services upon which companies depend is more limited. However, a recent publication by the Finance for Biodiversity Initiative and UNEP-WCMC provides a step-by-step approach for investors to start collecting and apply this kind of data in their decision-making.
>
> **II. Collecting information on the management practices that companies have put in place to address these risks –** This may include understanding the current strategy of the company in reducing their impacts on nature and managing their dependencies on nature, as well as any nature related risk mitigation measures they have set in place at different operating locations. While currently limited, data on the performance of companies in managing these risks is important for rewarding and encouraging positive behaviour to protect and restore nature in areas of high risk.

With the integration of the above data, Storebrand AM would then have a complete dataset of companies in the shortlist regarding their operating locations, the impacts they exert on nature, their level of dependency on nature, as well as their management response when facing these nature-related risks.

5. Engage with companies – Having the full information outlined above will allow Storebrand AM to directly engage with these companies and identify the best approach to reduce their impact and dependency related risks and encourage positive actions. This may include actions such as:

- Closing down specific operating sites that exert high pressures on nature.
- Starting to apply different nature risk screening tools when choosing new operating locations.
- Changing to deforestation-free agriculture.
- Sourcing from products that are less volatile to the decline of ecosystem services.
- Restore or protect nature and improve the provision of ecosystem services underpinning dependencies.

Recognising Storebrand AM as a signatory of the Finance for Biodiversity Pledge and Principles for Responsible Investment, direct engagement with companies would be a key mechanism for Storebrand AM to demonstrate progress against these commitments.

6. Track progress and take follow up actions – With the complete dataset collected and integrated in Step 4 above, Storebrand AM can monitor the individual progress of targeted companies in taking actions to reduce their impact and dependency related risks after the engagement process. Follow-up actions could be considered depending on the performance of companies, to either provide rewards or warnings based on high or low performance, respectively. This may range from increasing the investment of Storebrand AM due to reduced business risk and enable opportunities, or on the opposite end, divestment if no demonstrable progress has been made.

2 Methodology and limitations

2.1 Methodology

Impacts analysis

The main inputs to the impacts analysis methodology are outlined below.

1. **The ENCORE impacts knowledge base**, which outlines how different economic activities potentially impact on nature. This is a well-established knowledge base that draws on scientific and grey literature, supplemented by expert reviews. Further detail on the methodology used for developing the ENCORE knowledge base can be found below and on the ENCORE website.
2. **Storebrand Asset Management's portfolio** of bonds and equity. The key data used here were the columns:
    a. INSTRUMENT_TYPE (bond vs. equity)
    b. GICS_CODE
    c. NACE_CLASS_CODE
    d. NACE_SECTOR_CODE
    e. MARKET_VALUE (NOK)

The steps outlined below were used to conduct the impacts analysis.

1. Transfer Storebrand AM's portfolio data into GICS codes (see notes below on method for resolving GICS and NACE data).
2. Identify all relevant sub-industries in ENCORE, their associated impact drivers, and materiality ratings.
3. Match GICS data from Storebrand AM's portfolio with ENCORE's knowledge base on impacts.
    a. For each sub-industry, the value invested in the sub-industry was divided across impact drivers using the following formula:
        i. $Process\ Impact\ Score = \sum_{i=1}^{n} \frac{MR}{MRp} \times IC$

        Where:

        - There are *n* impact drivers *i* associated with the production process
        - *MR* = Materiality rating of impact driver for the process
        - MRp = Sum of all impact driver materiality ratings for the process
        - IC = Currency invested in process
4. Identify percentage of portfolio value associated with each materiality category (Figure 1).
5. Present data in Sankey diagram format (Figure 2).

6. Identify top 25 sub-industries according to their combined impact materiality ratings and reported associated market value in NOK (Table 2). The total unique combinations of impact materiality ratings and production processes is counted per sub-industry, each materiality rating is converted to a numerical score from 1-5. These are summed per sub-industry and the resulting scores are normalised to values between 0 and 1. Subsequently, the market values for each sub-industry are normalised to values between 0 and 1. This means the two normalised values (impact materiality ratings and market value) can be summed per sub-industry and a ranking can be assigned for the sub-industry based on this.

Applying the ENCORE impact materiality rating in this study

In ENCORE, each sector is assigned a series of impact drivers with different materiality ratings ranging from Very High, High, Medium, Low or Very Low based on available peer review and grey literature (as explained in Assessing the Materiality ratings of potential impacts below). Therefore, each sector has its own 'impacts profile' (i.e., the list of impacts it potentially leads to and their associated materiality ratings).

It is important to note that all sectors are not given the same impact materiality rating for the same impact driver. For example, water pollutants may be relevant to large-scale agriculture and infrastructure builds, but for agriculture it has a high materiality rating whereas for infrastructure builds it has a medium materiality rating.

This is accounted for in the analysis and means when the combination is made with the financial data on investment in different sectors from Storebrand AM's portfolio, the 'importance' of each impact driver is weighted based on: 1) the materiality of the impact driver for all relevant sectors (using ENCORE); and 2) the amount invested by Storebrand in those sectors.

Assessing the Materiality ratings of potential impacts

To assess the importance of a potential impact of a production process on natural capital, the following three aspects were considered in the ENCORE methodology:

1. How frequently might the impact occur?
    - High: The impact and its resulting effects on natural capital are expected to occur continuously throughout the project life cycle.
    - Medium: The impact and its resulting effects on natural capital are expected to occur regularly throughout the project life cycle (i.e., from several times per year to several times per month).
    - Low: The impact and its resulting effects on natural capital are expected to occur only a small number of times in the project life cycle (e.g., only during construction/set-up).
2. How quickly might the impact start to affect natural capital?
    - <1 year: The impact and its resulting effects on natural capital will occur within one year of the start of the production process.
    - 1-3 years: The impact and its resulting effects on natural capital will occur between one and three years after the start of the production process.

- >3 years: The impact and its resulting effects on natural capital will occur more than three years after the start of the production process.

3. How severe might the impact be?
    - High: The impact and its resulting effects are expected to cause major, irreparable, and long-lasting damage to natural capital.
    - Medium: The impact and its resulting effects are expected to cause significant and lasting damage to natural capital.
    - Low: The impact and its resulting effects are expected to cause minor, reparable, and temporary damage to natural capital.

Dependencies analysis

The main inputs to the dependency analysis methodology are outlined below.

1. The ENCORE dependency knowledge base, which outlines how different economic activities are potentially dependent on nature. This is a well-established knowledge base that draws on scientific and grey literature, supplemented by expert reviews. Further detail on the methodology used for developing the ENCORE knowledge base can be found below and on the ENCORE website.

2. Storebrand Asset Management's portfolio of bonds and equity. The key data used here were the columns:

a. INSTRUMENT_TYPE (bond vs. equity)

b. GICS_CODE

c. NACE_CLASS_CODE

d. NACE_SECTOR_CODE

e. MARKET_VALUE (NOK)

The steps outlined below were used to conduct the dependencies analysis.

1. Transfer Storebrand AM's portfolio data into GICS codes (see notes below on method for resolving GICS and NACE data).
2. Identify all relevant sub-industries in ENCORE, their associated dependencies and materiality ratings.
3. Match GICS data from Storebrand AM's portfolio with ENCORE's knowledge base on dependencies.
    a. For each sub-industry, the value invested in the sub-industry was divided across ecosystem services using the following formula:
        i. $Process\ Dependency\ Score = \sum_{i=1}^{n} \frac{MR}{MRp} \times IC$

        Where:

        - There are *n* ecosystem services *i* associated with the production process

- *MR* = Materiality rating of ecosystem services for the process
- MRp = Sum of all ecosystem services materiality ratings for the process
- IC = Currency invested in process

4. Identify percentage of portfolio value associated with each materiality category (Figure 3).
5. Present data in Sankey diagram format (Figure 4).
6. Identify top 25 sub-industries according to their combined dependency materiality ratings and reported associated market value in NOK (Table 4). The total unique combinations of dependency materiality ratings and production processes is counted per sub-industry, each materiality rating is converted to a numerical score from 1-5. These are summed per sub-industry and the resulting scores are normalised to values between 0 and 1. Subsequently, the market values for each sub-industry are normalised to values between 0 and 1. This means the two normalised values (dependency materiality ratings and market value) can be summed per sub-industry and a ranking can be assigned for the sub-industry based on this.

Applying the ENCORE dependency materiality rating in this study

In ENCORE, each sector is assigned a series of ecosystem services with different materiality ratings ranging from Very High, High, Medium, Low or Very Low based on available peer reviewed and grey literature (as explained in Assessing the Materiality ratings of potential dependencies below). Therefore, each sector has its own 'dependencies profile' (i.e., the list of ecosystem services it potentially depends on and their associated materiality ratings).

It is important to note that all sectors are not given the same dependency materiality rating for the same ecosystem service. For example, while both Oil & Gas Production in the energy sector and Brewers in Consumer Staples are dependent on Flood and Storm Protection ecosystem services, the former one has a very low materiality rating whereas the later one has a medium materiality rating.

This is accounted for in the analysis and means when the combination is made with the financial data on investment in different sectors from Storebrand AM's portfolio, the 'importance' of each ecosystem service is weighted based on: 1) the materiality of the ecosystem services for all relevant sectors (using ENCORE); and 2) the amount invested by Storebrand AM in those sectors.

Assessing the Materiality ratings of potential dependencies

To assess the potential importance of the contribution an ecosystem service makes to a production process, and the materiality of the impact if this service is disrupted, two aspects were considered:

1. How significant is the loss of functionality in the production process if the ecosystem service is disrupted?
    - Limited loss of functionality: the production process can continue as is or with minor modifications.
    - Moderate loss of functionality: the production process can continue only with important modifications (e.g., slower production or use of substitutes).
    - Severe loss of functionality: Disruption in the service provision prevents the production process.

2. How significant is the financial loss due to the loss of functionality in the production process?
    - Limited financial loss: Disruption to the production process doesn't materially affect the company's profits.
    - Moderate financial loss: Disruption to the production process materially affects the company's profits.
    - Severe financial loss: There is a reasonable possibility that the disruption in the production process will affect the financial viability of the company.

The dependency materiality assessment reflects both these considerations. A very high materiality rating means that the loss of functionality is severe and that the expected financial impact is severe as well.

Method for resolving GICS and NACE data

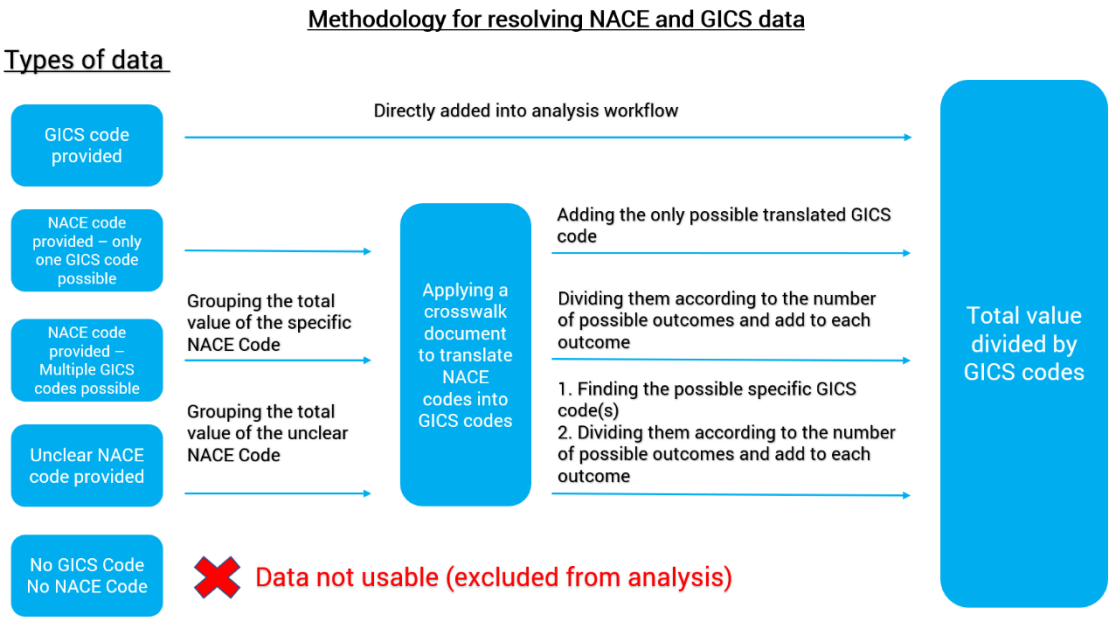


Figure 5. Summary diagram showing how Storebrand AM's portfolio data was converted into GICS codes.

In the analysis, GICS codes for each individual data item (i.e., each security) are required to enable analysis of the total market value of the portfolio divided by each GICS sub-industry. While the original dataset provided most of the data with a NACE code, only around half of them had a GICS code provided at the same time. As such, a translation process was required to convert NACE codes into associated GICS codes using a NACE code to GICS code crosswalk tool held by UNEP-WCMC.

As shown in Figure 5 above, there were five 'scenarios' in the industry classification data provided by Storebrand AM. One of these was directly usable for the impacts and dependencies analysis (GICS code provided). These data where the GICS code is provided can be directly added in to calculating the total value of the portfolio. The next three scenarios of data start with a NACE code and make use of the crosswalk to translate these into GICS codes. Some of the NACE codes matched directly to one GICS code, whereas others matched to several GICS codes. In the latter instance, the market value for each NACE code was divided equally across all relevant GICS codes. These steps help to ensure that: 1) all NACE code data can be translated into a GICS code accurately; and 2) double counting of data is avoided. The final scenario is where a security has neither a GICS code nor a NACE code provided. This applied to 0.8% of the total number of securities in the portfolio (58 securities in total; 24 in the equity data and 34 in the bonds data).

2.2 Limitations

There are certain limitations to the analysis, which should be considered when interpreting its results. Some of these result from the nature of industry classification data as outlined above. Others relate more specifically to the ENCORE knowledge base in its current form. These include:

- **Direct impacts only** – Currently the ENCORE knowledge base only covers direct potential impacts and dependencies, as such the analysis does not provide any information relating to Storebrand AM's indirect potential impacts and dependencies (e.g., those of companies that sit upstream of the securities held by Storebrand AM). This is particularly relevant given the weight of Financials in Storebrand AM's portfolio. For example, Storebrand AM may hold a security for a Regional Bank and that bank's direct impacts and dependencies will be included, but if that bank provides a loan to a mining company, the potential impacts and dependencies of that mining company will not be captured.

- **High-level screening nature of the analysis** – As noted in the 'Summary' section above, this analysis is high level. It is helpful for providing an initial view of potential priority areas for further investigation. In particular, it does not include company-level or location-specific data. One option for a more refined analysis was discussed with Storebrand AM at the outset of the project. This would involve identifying companies' revenue splits and matching these to the ENCORE knowledge base. Unfortunately, due to the size of Storebrand AM's portfolio it was not possible to conduct an analysis at this level of sophistication with the available time and resources in this project. However, in future Storebrand AM could undertake this by either 1) matching each security's revenue split to ENCORE's list of production processes (as stated above); or 2) creating generic 'impact and dependency profiles' based on average revenue splits for companies in each sector. This would involve making a crosswalk between the industry classification used for revenue split data from Trucost and ENCORE's list of production processes. While this would not change the screening nature of the analysis, it would enable Storebrand AM to drill-down into company-level information.

- **Certain sub-industries not yet covered by ENCORE** – Some sub-industries are not yet covered by ENCORE (e.g., Household Products). These had to be excluded from the analysis at this stage. This affected 0.15% of the total number of securities in the portfolio (10 securities in total; one in equity and nine in bonds). This is in addition to those excluded due to lack of GICS and NACE codes.

Further details on the general limitations of ENCORE's knowledge base can be found on the materiality and limitations pages of the ENCORE website.

3 Appendix

3.1 Impact drivers in ENCORE

An impact is different to an impact driver. Impacts are "changes in the quantity or quality of natural capital that occurs as a consequence of an impact driver. A single impact driver may be associated with multiple impacts" (Natural Capital Protocol, 2016[11]). In ENCORE, in accordance with the Natural Capital Protocol, impact drivers are defined as: a measurable quantity of a natural resource that is used as an input to production or a measurable non-product output of business activity.

The descriptions below are quoted directly from the Natural Capital Protocol. Through the literature reviews conducted as part of the research for ENCORE, the following additional impact drivers were also identified for certain production processes and are yet to be included in the database underpinning the tool: biological alterations/interferences, positive impacts, socio-cultural impacts.

Impact Drivers Listed in Encore	Examples
Disturbances	Examples include decibels and duration of noise, lumens and duration of light, at site of impact.
Freshwater ecosystem use	Examples include area of wetland, ponds, lakes, streams, rivers or peatland necessary to provide ecosystem services such as water purification, fish spawning, areas of infrastructure necessary to use rivers and lakes such as bridges, dams, and flood barriers, etc.
GHG emissions	Examples include volume of carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), Sulphur hexafluoride (SF6), Hydrofluorocarbons, (HFCs) and perfluorocarbons (PFCs), etc.
Marine ecosystem use	Examples include area of aquaculture by type, area of seabed mining by type, etc.
Non-GHG air pollutants	Examples include volume of fine particulate matter (PM2.5) and coarse particulate matter (PM10), Volatile Organic Compounds (VOCs), mono-nitrogen oxides (NO and NO2, commonly referred to as NOx), Sulphur dioxide (SO2), Carbon monoxide (CO), etc.
Other resource use	Examples include volume of mineral extracted, volume of wild-caught fish by species, number of wild-caught mammals by species, etc.
Soil pollutants	Examples include volume of waste matter discharged and retained in soil over a given period.
Solid waste	Examples include volume of waste by classification (i.e., non-hazardous, hazardous, and radioactive), by specific material constituents (e.g., lead, plastic), or by disposal method (e.g., landfill, incineration, recycling, specialist processing).
Terrestrial ecosystem use	Examples include area of agriculture by type, area of forest plantation by type, area of open cast mine by type, etc.
Water pollutants	Examples include volume discharged to receiving water body of nutrients (e.g., nitrates and phosphates) or other substances (e.g., heavy metals and chemicals).
Water use	Examples include volume of groundwater consumed, volume of surface water consumed, etc.

[11] Natural Capital Coalition, 2016. "Natural Capital Protocol". (Online) Available at: www.naturalcapitalcoalition.org/protocol

3.2 Ecosystem services in ENCORE

In ENCORE, ecosystem services are the links between nature and business. Each of these services represent a benefit that nature provides to enable or facilitate business production processes. Ecosystem services were classified according to the Common International Classification of Ecosystem Services (CICES) which comprises a five-level hierarchical structure, for example: Section (e.g., Provisioning), Division (e.g., Nutrition), Group (e.g., Terrestrial plants and animals for food), Class (e.g., crops), and Class type (e.g., wheat). Cultural ecosystem services were not considered in this project as they are not considered to be direct inputs or to enable production processes. The CICES framework has been simplified as below for use in ENCORE:

Ecosystem Services listed in Encore	Explanation
Animal-based energy	Physical labour is provided by domesticated or commercial species, including oxen, horses, donkeys, goats and elephants. These can be grouped as draught animals, pack animals and mounts.
Bio-remediation	Bio-remediation is a natural process whereby living organisms such as micro-organisms, plants, algae, and some animals degrade, reduce, and/or detoxify contaminants.
Buffering and attenuation of mass flows	Buffering and attenuation of mass flows allows the transport and storage of sediment by rivers, lakes and seas.
Climate regulation	Global climate regulation is provided by nature through the long-term storage of carbon dioxide in soils, vegetable biomass, and the oceans. At a regional level, the climate is regulated by ocean currents and winds while, at local and micro-levels, vegetation can modify temperatures, humidity, and wind speeds.
Dilution by atmosphere and ecosystems	Water, both fresh and saline, and the atmosphere can dilute the gases, fluids and solid waste produced by human activity.
Disease control	Ecosystems play important roles in regulation of diseases for human populations as well as for wild and domesticated flora and fauna.
Fibres and other materials	Fibres and other materials from plants, algae and animals are directly used or processed for a variety of purposes. This includes wood, timber, and fibres which are not further processed, as well as material for production, such as cellulose, cotton, and dyes, and plant, animal and algal material for fodder and fertiliser use.
Filtration	Filtering, sequestering, storing, and accumulating pollutants is carried out by a range of organisms including, algae, animals, microorganisms and vascular and non-vascular plants.
Flood and storm protection	Flood and storm protection is provided by the sheltering, buffering and attenuating effects of natural and planted vegetation.
Genetic materials	Genetic material is understood to be deoxyribonucleic acid (DNA) and all biota including plants, animals and algae.
Ground water	Groundwater is water stored underground in aquifers made of permeable rocks, soil and sand. The water that contributes to groundwater sources originates from rainfall, snow melts and water flow from natural freshwater resources.
Maintain nursery habitats	Nurseries are habitats that make a significantly high contribution to the reproduction of individuals from a particular species, where juveniles occur at higher densities, avoid predation more successfully, or grow faster than in other habitats.
Mass stabilisation	Mass stabilisation and erosion control is delivered through vegetation cover protected and stabilising terrestrial, coastal and marine ecosystems, coastal wetlands and dunes.

and erosion control	Vegetation on slopes also prevents avalanches and landslides, and mangroves, sea grass and macroalgae provide erosion protection of coasts and sediments.
Mediation of sensory impacts	Vegetation is the main (natural) barrier used to reduce noise and light pollution, limiting the impact it can have on human health and the environment.
Pest control	Pest control and invasive alien species management is provided through direct introduction and maintenance of populations of the predators of the pest or the invasive species, landscaping areas to encourage habitats for pest reduction, and the manufacture of a family of natural biocides based on natural toxins to pests.
Pollination	Pollination services are provided by three main mechanisms: animals, water and wind. The majority of plants depend to some extent on animals that act as vectors, or pollinators, to perform the transfer of pollen.
Soil quality	Soil quality is provided through weathering processes, which maintain bio-geochemical conditions of soils including fertility and soil structure, and decomposition and fixing processes, which enables nitrogen fixing, nitrification and mineralisation of dead organic material.
Surface water	Surface water is provided through freshwater resources from collected precipitation and water flow from natural sources.
Ventilation	Ventilation provided by natural or planted vegetation is vital for good indoor air quality and without it there are long term health implications for building occupants due to the build-up of volatile organic compounds (VOCs), airborne bacteria and moulds.
Water flow maintenance	The hydrological cycle, also called water cycle or hydrologic cycle, is the system that enables circulation of water through the Earth's atmosphere, land, and oceans. The hydrological cycle is responsible for recharge of groundwater sources (i.e., aquifers) and maintenance of surface water flows.
Water quality	Water quality is provided by maintaining the chemical condition of freshwaters, including rivers, streams, lakes, and ground water sources, and salt waters to ensure favourable living conditions for biota.

3.3 Materiality of different impact drivers for the top 25 sub-industries

Key: ND = No Data, VL = Very Low, L = Low, M = Medium, H = High, VH = Very High.

Industry	Sub-industry	Production Process	Disturbances	Freshwater ecosystem use	GHG emissions	Marine ecosystem use	Non-GHG air pollutants	Other resource use	Soil pollutants	Solid waste	Terrestrial ecosystem use	Water pollutants	Water use
Consumer Staples	Agricultural Products	Aquaculture	ND	VH	ND	H	ND	ND	H	ND	ND	H	ND
		Freshwater wild-caught fish	ND	VH	ND	ND	ND	H	ND	ND	ND	H	ND
		Large-scale irrigated arable crops	ND	VH	ND	ND	ND	ND	H	ND	VH	H	VH
		Large-scale livestock (beef and dairy)	ND	ND	H	ND	ND	ND	M	ND	VH	M	VH
		Large-scale rainfed arable crops	ND	ND	ND	ND	ND	L	H	ND	VH	H	ND
		Saltwater wild-caught fish	ND	ND	ND	VH	ND	H	ND	ND	ND	M	ND
		Small-scale irrigated arable crops	ND	H	ND	ND	ND	ND	M	ND	VH	M	H
		Small-scale livestock (beef and dairy)	ND	ND	H	ND	ND	ND	M	ND	VH	M	H
		Small-scale rainfed arable crops	ND	ND	ND	ND	ND	L	M	ND	VH	M	ND
Materials	Aluminium	Alumina refining	ND	ND	H	ND	ND	ND	H	H	ND	H	VH
		Mining	H	H	H	ND	H	ND	H	H	VH	H	VH
Energy	Coal & Consumable Fuels	Mining	H	H	H	ND	H	ND	H	H	VH	H	VH
Industrials	Construction & Engineering	Infrastructure builds	H	H	H	VH	H	ND	H	M	VH	M	H
		Infrastructure maintenance contracts	ND	ND	H	ND	L	ND	L	ND	M	L	H
Materials	Construction Materials	Construction materials production	H	H	H	H	M	ND	ND	H	VH	M	H
Materials	Copper	Mining	H	H	H	ND	H	ND	H	H	VH	H	VH
Financials	Diversified Banks	Financial services	ND	ND	ND	ND	ND	ND	ND	M	ND	ND	ND
Materials	Diversified Chemicals	Incomplete combustion	ND	ND	H	ND	H	ND	ND	ND	H	ND	H

Industry	Sub-industry	Production Process	Disturbances	Freshwater ecosystem use	GHG emissions	Marine ecosystem use	Non-GHG air pollutants	Other resource use	Soil pollutants	Solid waste	Terrestrial ecosystem use	Water pollutants	Water use
		Polymerization	ND	ND	ND	ND	M	ND	H	ND	H	H	VH
		Vulcanisation	ND	ND	H	ND	H	ND	L	H	ND	L	H
Materials	Diversified Metals & Mining	Mining	H	H	H	ND	H	ND	H	H	VH	H	VH
Industrials	Diversified Support Services	Infrastructure holdings	ND	ND	ND	ND	M	ND	H	M	ND	H	H
Utilities	Electric Utilities	Electric/nuclear power transmission and distribution	ND	ND	H	ND	ND	ND	ND	ND	M	M	ND
		Hydropower production	ND	VH	H	ND	ND	ND	H	ND	VH	H	VH
		Infrastructure holdings	ND	ND	ND	ND	M	ND	H	M	ND	H	H
		Nuclear and thermal power stations	H	H	H	ND	H	ND	M	H	ND	M	VH
Materials	Gold	Mining	H	H	H	ND	H	ND	H	H	VH	H	VH
Industrials	Highways & Rail tracks	Construction	H	H	H	ND	H	ND	M	H	VH	M	H
Consumer Discretionary	Homebuilding	Construction	H	H	H	ND	H	ND	M	H	VH	M	H
Utilities	Independent Power Producers & Energy Traders	Electric/nuclear power transmission and distribution	ND	ND	H	ND	ND	ND	ND	ND	M	M	ND
		Hydropower production		VH	H	ND	ND	ND	H	ND	VH	H	VH
		Infrastructure holdings	ND	ND	ND	ND	M	ND	H	M	ND	H	H
		Nuclear and thermal power stations	H	H	H	ND	H	ND	M	H	ND	M	VH
Materials	Industrial Gases	Catalytic cracking, fractional distillation and crystallization	ND	ND	H	ND	H	ND	H	H	H	H	H
		Cryogenic air separation	H	ND		ND	L	ND	M	ND	ND	M	H
		Gas adsorption	ND	ND	H	ND	ND	ND	ND	ND	ND	ND	ND
		Membrane technology	ND	ND	H	ND	ND	ND	ND	ND	ND	ND	ND
		Natural gas combustion	ND	ND	H	ND	H	ND	H	ND	H	H	VH

Industry	Sub-industry	Production Process	Disturbances	Freshwater ecosystem use	GHG emissions	Marine ecosystem use	Non-GHG air pollutants	Other resource use	Soil pollutants	Solid waste	Terrestrial ecosystem use	Water pollutants	Water use
		Recovery and separation of carbon dioxide	H	*ND*	H	*ND*	M	*ND*	L	M	*ND*	L	*ND*
Energy	Integrated Oil & Gas	Integrated oil and gas	H	VH	H	VH	H	*ND*	M	H	VH	M	VH
Industrials	Marine Ports & Services	Marine ports and services	H	VH	H	VH	*ND*	*ND*	H	M	H	H	*ND*
Energy	Oil & Gas Drilling	Oil and gas drilling	H	H	H	VH	H	*ND*	H	H	H	H	VH
Energy	Oil & Gas Exploration & Production	Oil and gas exploration surveys	H	H	H	M	H	*ND*	H	H	H	H	VH
Materials	Precious Metals & Minerals	Mining	H	H	H	*ND*	H	*ND*	H	H	VH	H	VH
Real Estate	Real Estate Operating Companies	Real estate activities	*ND*	*ND*	H	*ND*	M	*ND*	M	H	VH	M	*ND*
Financials	Regional Banks	Financial services	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	M	*ND*	*ND*	*ND*
Utilities	Renewable Electricity	Biomass energy production	*ND*	*ND*	H	*ND*	H	*ND*	*ND*	H	*ND*	H	H
		Geothermal energy production	H	*ND*	H	*ND*	*ND*	*ND*	H	*ND*	*ND*	H	VH
		Hydropower production	*ND*	VH	H	*ND*	*ND*	*ND*	H	*ND*	VH	H	VH
		Solar energy provision	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	L	*ND*	VH	L	VH
		Wind energy provision	M	M	*ND*	H	*ND*	*ND*	L	*ND*	H	L	*ND*
Materials	Silver	Mining	H	H	H	*ND*	H	*ND*	H	H	VH	H	VH

3.4 Materiality of different ecosystem services for the top 25 sub-industries

Key: ND = No Data, VL = Very Low, L = Low, M = Medium, H = High, VH = Very High.

Ecosystem service abbreviations: BR = Bio-remediation, DC = Disease control, F = Filtration, GM = Genetic materials, GW = Ground water, PC = Pest control, P= Pollination, SQ = Soil quality, SW = Surface water, V = Ventilation, WM = Waterflow maintenance, WQ= Water quality.

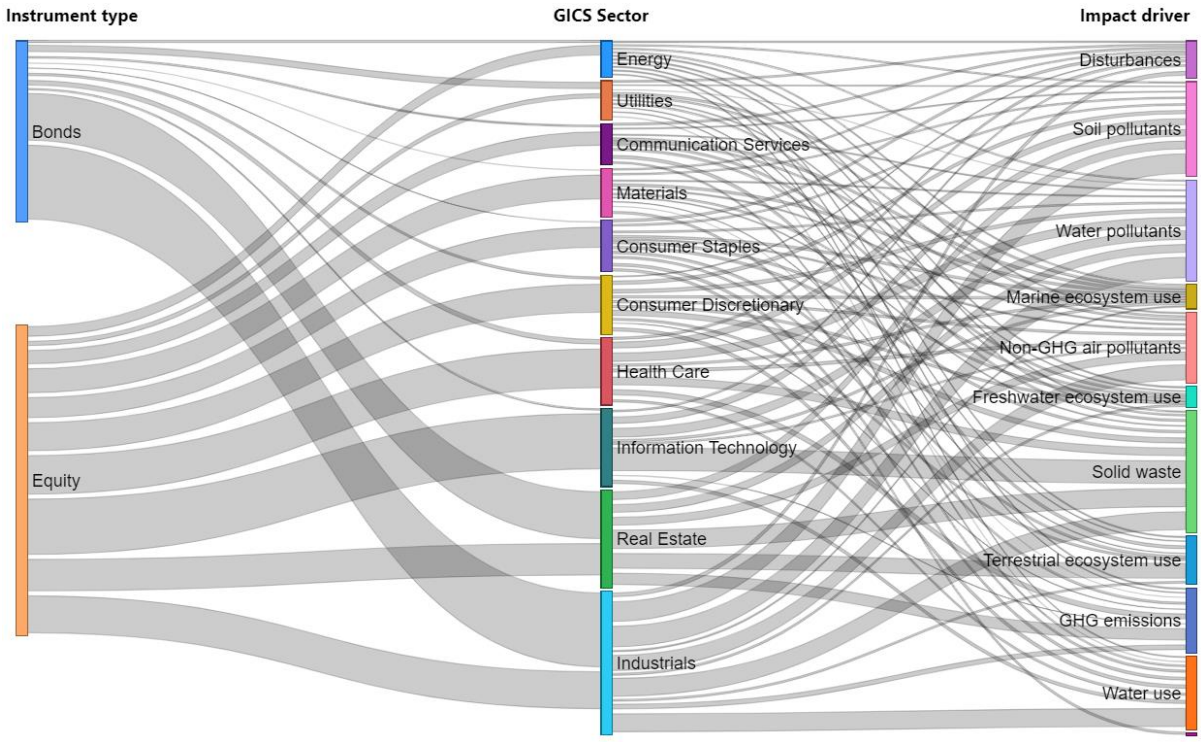
Industry	Sub- Industry	Production Process	Animal-based energy	BR	Buffering and attenuation of mass flows	Climate regulation	Dilution by atmosphere and ecosystems	DC	Fibres and other materials	F	Flood and storm protection	GM	GW	Maintain nursery habitats	Mass stabilisation and erosion control	Mediation of sensory impacts	PC	P	SQ	SW	V	WM	WQ
Consumer Staples	Agricultural Products	Aquaculture	ND	M	M	H	M	M	VH	L	H	VL	VL	M	H	ND	M	ND	VL	M	M	H	H
		Freshwater wild-caught fish	ND	ND	VH	VH	VL	L	ND	ND	ND	M	ND	VH	VL	ND	L	ND	M	VH	L	ND	VH
		Large-scale irrigated arable crops	VL	M	H	H	M	H	M	M	VH	M	VH	ND	VH	ND	H	H	H	H	L	H	H
		Large-scale livestock (beef and dairy)	ND	M	L	M	L	M	VH	M	M	VL	VH	ND	L	L	L	VL	H	VH	VL	M	M
		Large-scale rainfed arable crops	VL	M	H	H	M	H	M	M	VH	M	ND	ND	VH	ND	H	H	H	M	L	H	VL
		Saltwater wild-caught fish	ND	ND	M	ND	VL	ND	ND	ND	ND	M	ND	VH	VL	ND	L	ND	VL	VH	VL	ND	VH
		Small-scale irrigated arable crops	VH	M	H	VH	M	VH	M	M	VH	M	VH	ND	VH	ND	VH	VH	VH	VH	L	VH	VH
		Small-scale livestock (beef and dairy)	ND	M	L	H	L	H	VH	M	VH	VL	VH	ND	L	L	M	VL	H	VH	VL	H	VH
		Small-scale rainfed arable crops	VH	M	H	VH	M	VH	M	M	VH	M	ND	ND	VH	ND	VH	VH	VH	M	L	VH	VL
Materials	Aluminium	Alumina refining	ND	ND	ND	M	ND	ND	ND	ND	ND	ND	M	ND	L	ND	ND	ND	ND	M	ND	M	ND
		Mining	ND	ND	ND	H	ND	ND	ND	ND	ND	ND	H	ND	M	ND	ND	ND	ND	H	ND	H	ND
Consumer Discretionary	Apparel, Accessories & Luxury Goods	Jewellery production	ND	L	ND	ND	L	ND	M	L	M	ND	M	ND	L	ND	ND	ND	ND	M	ND	M	L
		Natural fibre production	ND	L	ND	ND	L	ND	M	L	M	ND	VH	ND	L	ND	ND	ND	ND	VH	ND	M	L
		Synthetic fibre production	ND	L	ND	ND	L	ND	M	L	M	ND	VH	ND	VL	ND	ND	ND	ND	VH	ND	M	L
	Automobile Manufacturers	Manufacture of machinery, parts and equipment	ND	ND	ND	VL	L	ND	ND	VL	M	ND	M	ND	VL	M	ND	ND	ND	M	VL	M	L

Industry	Sub- Industry	Production Process	Animal-based energy	BR	Buffering and attenuation of mass flows	Climate regulation	Dilution by atmosphere and ecosystems	DC	Fibres and other materials	F	Flood and storm protection	GM	GW	Maintain nursery habitats	Mass stabilisation and erosion control	Mediation of sensory impacts	PC	P	SQ	SW	V	WM	WQ
Financials	Diversified Banks	Financial services	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	L	ND	ND	ND	ND	ND	ND	ND	ND
	Diversified Capital Markets	Financial services	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	L	ND	ND	ND	ND	ND	ND	ND	ND
Industrials	Diversified Support Services	Infrastructure holdings	ND	VL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	L	ND	ND	ND	ND	ND	ND	ND	ND
Utilities	Electric Utilities	Electric/nuclear power transmission and distribution	ND	ND	ND	M	ND	ND	ND	ND	VH	ND	ND	ND	H	ND	ND	ND	ND	ND	ND	ND	ND
		Hydropower production	ND	VL	ND	VH	ND	ND	ND	VL	H	ND	M	ND	H	ND	ND	ND	ND	VH	ND	VH	L
		Infrastructure holdings	ND	VL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	L	ND	ND	ND	ND	ND	ND	ND	ND
		Nuclear and thermal power stations	ND	VL	ND	VL	ND	ND	ND	L	M	ND	M	ND	L	ND	ND	ND	ND	VH	ND	M	L
Materials	Forest Products	Large-scale forestry	VL	M	ND	VH	ND	H	VH	VL	VH	ND	VH	ND	VH	ND	H	H	H	VH	ND	H	ND
		Production of forest and wood-based products	ND	ND	ND	ND	ND	ND	ND	ND	M	ND	H	ND	L	ND	ND	ND	ND	VH	ND	M	ND
		Small-scale forestry	VH	M	ND	VH	ND	VH	VH	VL	M	ND	VH	ND	VH	ND	VH	H	H	VH	ND	VH	ND
Industrials	Highways & Rail tracks	Construction	ND	L	ND	H	ND	ND	ND	L	H	ND	M	ND	M	M	VL	ND	L	M	VL	M	ND
Consumer Discretionary	Hotels, Resorts & Cruise Lines	Cruise line provision	ND	ND	ND	H	ND	ND	ND	ND	H	ND	M	ND	L	ND	ND	ND	ND	M	ND	ND	L
		Hotels and resorts provision	ND	ND	ND	M	ND	ND	M	ND	M	ND	H	ND	L	ND	ND	ND	ND	H	ND	ND	L
Utilities	Independent Power Producers & Energy Traders	Electric/nuclear power transmission and distribution	ND	ND	ND	M	ND	ND	ND	ND	VH	ND	ND	ND	H	ND	ND	ND	ND	ND	ND	ND	ND
		Hydropower production	ND	VL	ND	VH	ND	ND	ND	VL	H	ND	M	ND	H	ND	ND	ND	ND	VH	ND	VH	L
		Infrastructure holdings	ND	VL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	L	ND	ND	ND	ND	ND	ND	ND	ND
		Nuclear and thermal power stations	ND	VL	ND	VL	ND	ND	ND	L	M	ND	M	ND	L	ND	ND	ND	ND	VH	ND	M	L
Materials	Industrial Gases	Catalytic cracking, fractional distillation and crystallization	ND	VL	ND	L	ND	ND	ND	VL	M	ND	H	ND	L	L	ND	ND	ND	H	VL	L	L
		Cryogenic air separation	ND	VL	ND	VL	VL	ND	ND	VL	M	ND	L	ND	L	L	ND	ND	ND	L	VL	L	L

Industry	Sub- Industry	Production Process	Animal-based energy	BR	Buffering and attenuation of mass flows	Climate regulation	Dilution by atmosphere and ecosystems	DC	Fibres and other materials	F	Flood and storm protection	GM	GW	Maintain nursery habitats	Mass stabilisation and erosion control	Mediation of sensory impacts	PC	P	SQ	SW	V	WM	WQ
Materials	Industrial Gases	Gas adsorption	ND	VL	ND	VL	VL	ND	ND	VL	M	ND	L	ND	L	L	ND	ND	ND	L	VL	L	L
		Membrane technology	ND	VL	ND	VL	VL	ND	ND	VL	M	ND	L	ND	L	L	ND	ND	ND	L	VL	L	L
		Natural gas combustion	ND	L	ND	VL	L	ND	ND	L	M	ND	M	ND	L	L	ND	ND	ND	M	VL	M	L
		Recovery and separation of carbon dioxide	ND	VL	ND	VL	VL	ND	ND	VL	M	ND	L	ND	L	L	ND	ND	ND	L	VL	L	L
Industrials	Industrial Machinery	Manufacture of machinery, parts and equipment	ND	ND	ND	VL	L	ND	ND	VL	M	ND	M	ND	VL	M	ND	ND	ND	M	VL	M	L
Energy	Integrated Oil & Gas	Integrated oil and gas	ND	M	ND	M	ND	ND	ND	M	H	ND	VH	ND	M	ND	ND	ND	ND	H	ND	ND	H
Financials	Life & Health Insurance	Financial services	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	L	ND	ND	ND	ND	ND	ND	ND	ND
Consumer Staples	Packaged Foods & Meats	Processed food and drink production	ND	L	ND	ND	L	ND	ND	L	M	ND	VH	ND	L	ND	ND	ND	VL	VH	ND	M	M
Health Care	Pharmaceuticals manufacturing	Life science, pharma and biotech manufacture	ND	VL	ND	ND	ND	ND	ND	VL	ND	M	M	ND	L	ND	ND	ND	ND	H	ND	M	L
Real Estate	Real Estate Operating Companies	Real estate activities	ND	L	ND	ND	ND	ND	ND	VL	VL	ND	M	ND	L	L	ND	ND	ND	H	ND	ND	ND
	Real Estate Services	Real estate activities	ND	L	ND	ND	ND	ND	ND	VL	VL	ND	M	ND	L	L	ND	ND	ND	H	ND	ND	ND
Financials	Regional Banks	Financial services	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	L	ND	ND	ND	ND	ND	ND	ND	ND
Utilities	Renewable Electricity	Biomass energy production	ND	VL	ND	VL	ND	ND	VH	VL	M	ND	M	ND	L	ND	ND	ND	ND	M	ND	M	L
		Geothermal energy production	ND	VL	ND	VL	ND	ND	ND	VL	M	ND	VH	ND	L	ND	ND	ND	ND	M	ND	M	L
		Hydropower production	ND	VL	ND	VH	ND	ND	ND	VL	H	ND	M	ND	H	ND	ND	ND	ND	VH	ND	VH	L
		Solar energy provision	ND	ND	ND	VH	ND	ND	ND	ND	M	ND	VL	ND	M	ND	ND	ND	ND	VL	ND	ND	ND
		Wind energy provision	ND	ND	ND	VH	ND	ND	ND	ND	M	ND	ND	ND	M	ND	ND	ND	ND	ND	ND	ND	ND
Consumer Staples	Soft Drinks	Processed food and drink production	ND	L	ND	ND	L	ND	ND	L	M	ND	VH	ND	L	ND	ND	ND	VL	VH	ND	M	M
Materials	Specialty Chemicals	Catalytic cracking, fractional distillation and crystallization	ND	VL	ND	L	ND	ND	ND	VL	M	ND	H	ND	L	L	ND	ND	ND	H	VL	L	L

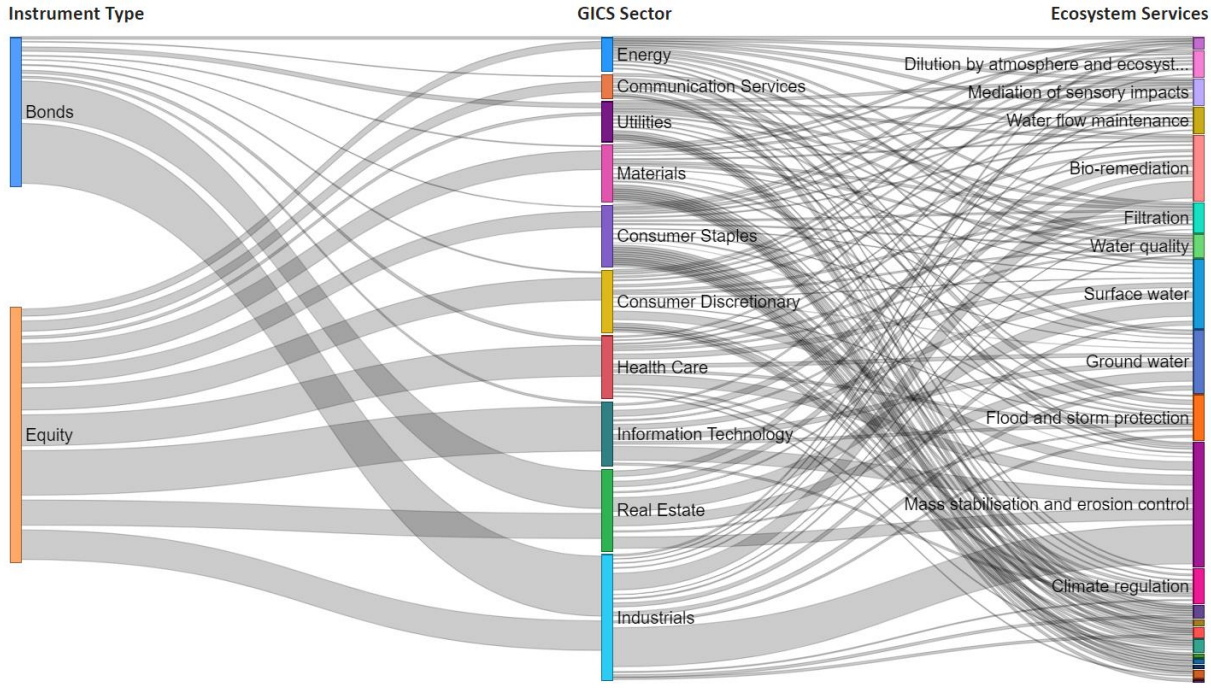
Industry	Sub- Industry	Production Process	Animal-based energy	BR	Buffering and attenuation of mass flows	Climate regulation	Dilution by atmosphere and ecosystems	DC	Fibres and other materials	F	Flood and storm protection	GM	GW	Maintain nursery habitats	Mass stabilisation and erosion control	Mediation of sensory impacts	PC	P	SQ	SW	V	WM	WQ
Materials	Speciality Chemicals	Solids processing	*ND*	VL	*ND*	VL	L	*ND*	*ND*	L	M	*ND*	L	*ND*	L	L	*ND*	*ND*	*ND*	L	VL	L	L
Utilities	Water Utilities	Water services (e.g. waste water, treatment and distribution)	*ND*	M	L	M	*ND*	*ND*	*ND*	M	M	*ND*	VH	*ND*	L	L	L	*ND*	M	VH	*ND*	VH	H

3.5 Summary diagram of links between Storebrand AM's portfolio data, relevant GICS Sectors, and ENCORE impact drivers, with financials removed



Flows are weighted by impact materiality ratings and NOK invested in each GICS Sector. The bottom-most impact driver is 'Other resource use'.

3.6 Summary diagram of links between Storebrand AM's portfolio data, relevant GICS Sectors, and ENCORE ecosystem services, with financials removed



Flows are weighted by dependency materiality ratings and NOK invested in each GICS Sector. The ecosystem services that are without labels are: buffering and attenuation of mass flows, animal-based energy, pollination, disease control, genetic materials, and maintenance of nursery habitats.