ASN Bank Biodiversity Footprint

Biodiversity Footprint for Financial Institutions Impact Assessment 2016 – 2020

PRé

Fact-based sustainability

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Executive summary

Introduction

ASN Bank is aiming for a net-positive impact on biodiversity for its portfolio of loans and investments by 2030. Since 2014, the Biodiversity Footprint for Financial Institutions (BFFI) is used to calculate the bank's biodiversity footprint and monitor progress towards this objective. The BFFI combines a quantitative footprint calculation and a qualitative analysis. The footprint result is expressed as the number of hectares where all biodiversity is lost. The qualitative analysis focuses on impacts which cannot yet be covered by the quantitative calculation and serves as an interpretation guide.

In this report, the biodiversity footprint of 2020 is presented. The biodiversity footprint of the ASN Bank balance is reported separately from the ASN Impact Investors funds. For ASN Bank, the following types of investment are included:

- Sovereign bonds
- Local government
- Mortgages
- Wind energy projects
- Solar energy projects
- Bio energy projects
- Other renewable energy projects
- Climate bonds
- Residential construction
- Housing corporations
- Health & welfare
- Water Boards (Waterschappen)
- Rail transport

For ASN Impact Investors the following types of investment are included:

- Sovereign bonds
- Local government
- Green bonds
- Listed equity
- Mortgages
- Wind energy projects
- Solar energy projects
- Bio energy projects
- Other renewable energy projects
- Construction

ASN Bank balance sheet

Figure 1 shows the total value of the investments on the ASN Bank balance sheet and the impact on biodiversity, grouped per asset class (with each asset class in a different colour). The biodiversity footprint also shows negative values which represent an 'avoided' negative impact on biodiversity from renewable energy projects (including climate bonds). This avoided impact on biodiversity is mainly caused by avoided greenhouse gas (GHG) emissions from energy production using fossil fuels. Since climate change is one of the main drivers of biodiversity loss, the avoided GHG emissions lead to an avoided impact on biodiversity. More details on the impact of renewable energy can be found in chapter 2.

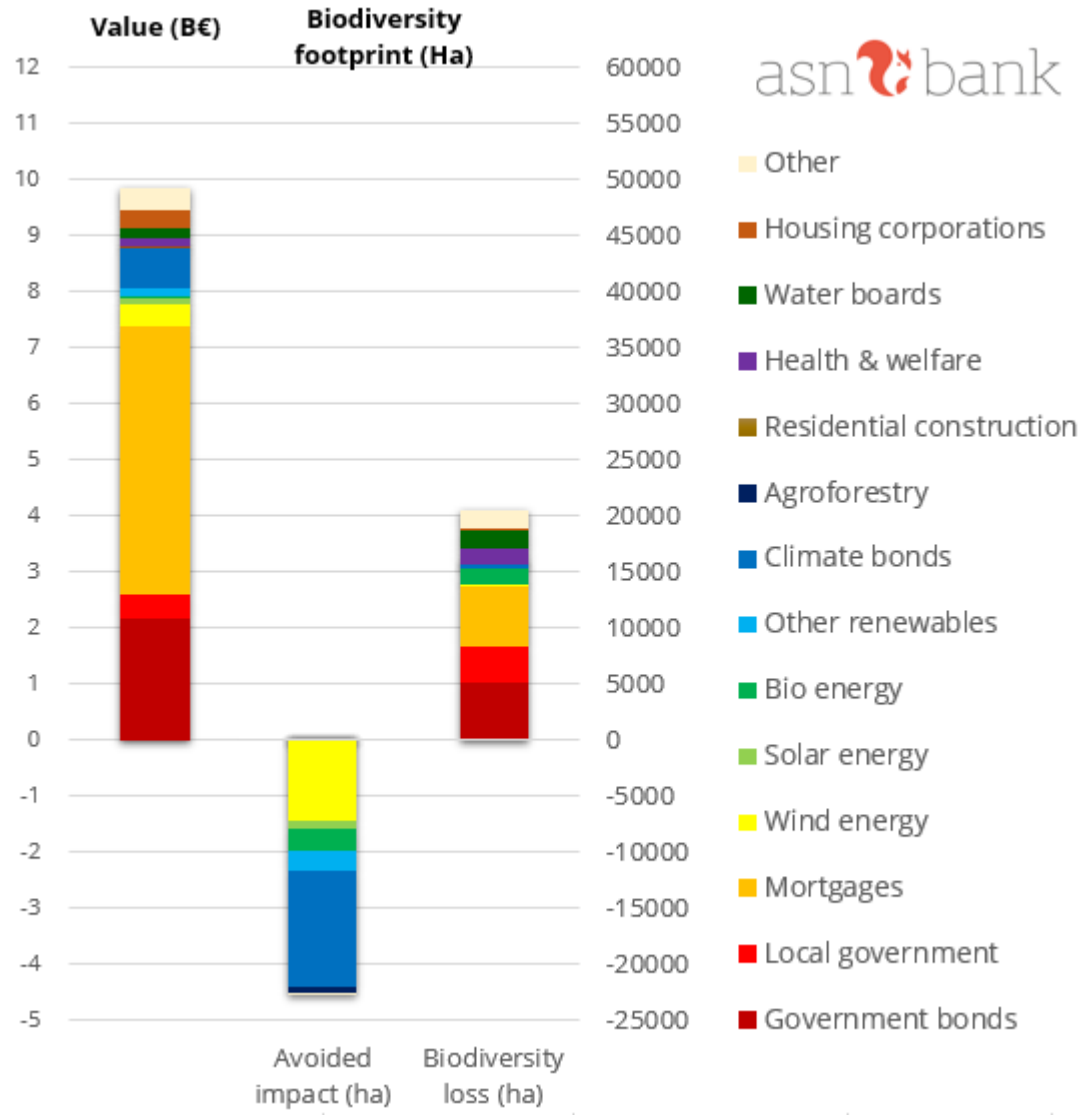

Figure 1: Total value and total biodiversity impacts of investments on the ASN Bank balance.

Mortgages and government bonds represent the majority of the financial value of ASN Bank's balance sheet (49% and 22% respectively). Most of the negative biodiversity impact is attributed to mortgages (26%), national government bonds (25%) and local government bonds (16%). This high impact is mostly cause by the size of the investments in these asset classes rather than the magnitude of the impact per invested euro.

Most avoided impact is achieved with investments in climate bonds (46% of all avoided impact) and in wind energy (32% of all avoided impact). The climate bonds are investments in climate change mitigation or adaptation related projects, like energy efficiency projects or GHG reduction activities such as renewable energy projects. The impact is estimated using the average impact of renewable energy projects funded by ASN Bank.

ASN Impact Investors

For ASN Impact Investors (AII), the footprint results are reported per fund, see figure 2. The biodiversity impact of individual investments is available to AII in a separate spreadsheet.

The two funds with the biggest financial value, “Duurzaam Aandelenfonds” and “Milieu & Waterfonds”, also represent the biggest share of negative impact on biodiversity. However, large differences in impact are found between funds, between investments within funds and between equity securities. Most avoided impact is caused by investments in renewable energy in the “Groenprojectenfonds”. Both through direct investment in wind and solar projects, but also by investing in climate bonds.

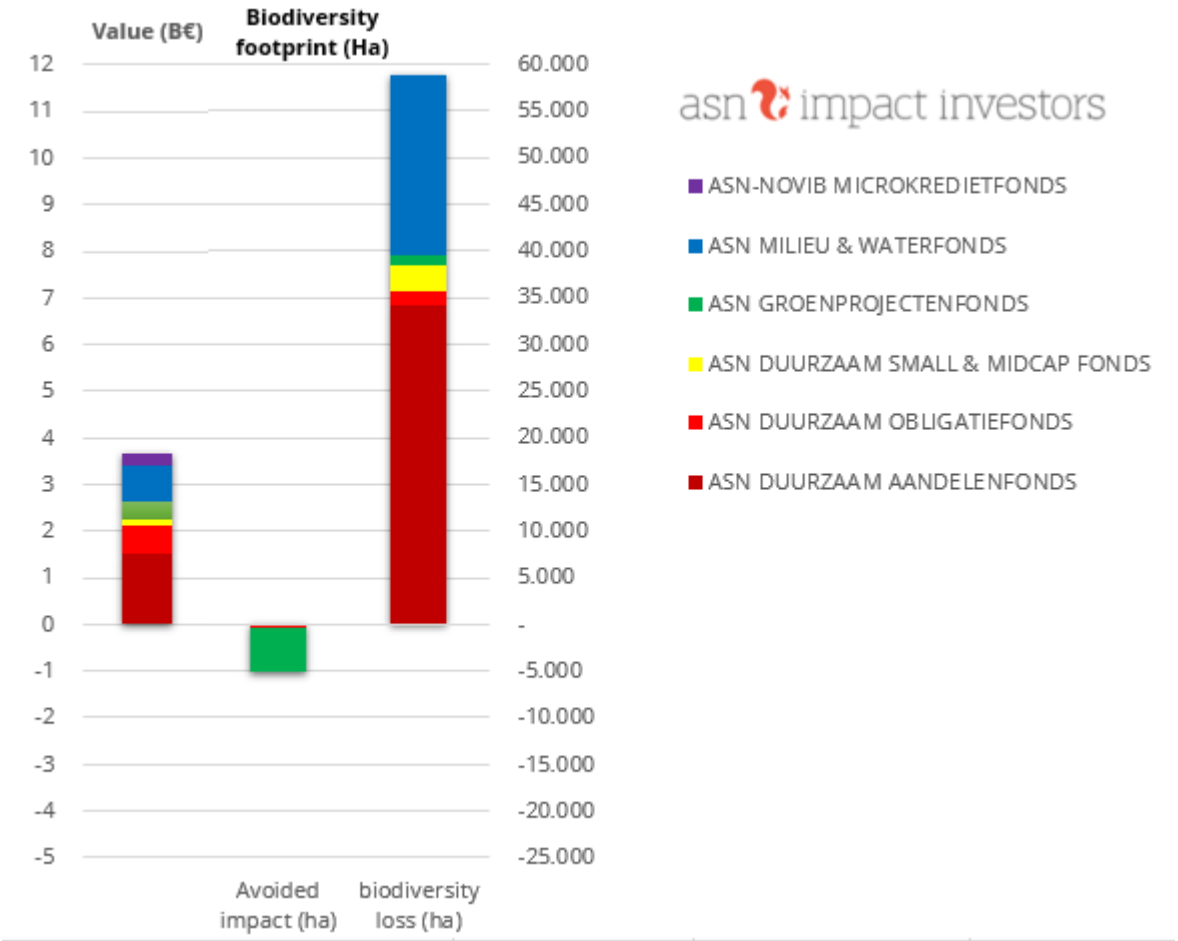

Figure 2: Total value and total biodiversity impacts of the ASN Impact Investors investment funds.
*No impact was calculated for the ASN Microcredit Fund due to a lack of data.

ASN Bank balance sheet and ASN Impact Investors funds

The footprint of ASN Bank’s balance sheet and ASN Impact Investors funds is the sum of impact of all underlying investments. Looking at the different drivers of biodiversity loss, we see that most impact is caused by four drivers: land use, climate change, terrestrial acidification, and water use.

To understand what companies or sectors have the highest impact and where in the supply chain this impact takes place, a more detailed analysis per company is needed.

The two figures show that the financial value of the ASN Impact Investor funds is relatively low compared to the total value of assets on the ASN Bank balance sheet. The total impact, however, is much higher. The reason for this is that the average impact of investments in equity (the majority of ASN Impact Investors assets) is much higher than the average impact of government bonds and mortgages (the majority of assets on the ASN Bank balance). The average impact of investments in equity is larger than the average impact of government bonds and mortgages, due to the nature of the investment or loan. For mortgages for instance, a relatively large loan is provided while the impact from the loan is relatively small (annual residential energy use). For government bonds, all government spending is taken into account, this can have a large impact on biodiversity, but the share attributed to the investor is proportional to the government debt, so only a fraction of the government spending is attributed to the investment made by ASN Bank. For investments in common stocks, the footprint is based on impact of the economic activities needed to generate the company's revenue. For listed equity, the investee is only responsible for the proportion of shares compared to the market capitalisation. The type of activities financed by listed equity however, are more impactful than domestic energy use or a small share of the government spending.

Dependencies on Ecosystem Services

The dependencies on ecosystem services are assessed for ASN Impact Investors' investments in listed equity. Recent research by the Dutch Central Bank (DNB) and PBL Netherlands Environmental Assessment Agency has shown that the dependency on ecosystem services like pollination may pose a significant risk to the Dutch financial sector ('Indebted to nature; Exploring biodiversity risks for the Dutch financial sector', June 2020). This study used sector-specific dependency data from the ENCORE knowledge base, developed by the Natural Capital Finance Alliance ('NCFA'; consisting of Global Canopy, UNEP Finance Initiative, UNEP-WCMC).

In this report the ecosystem service dependencies in ASN Impact Investors' investments in listed companies is analyzed. For each company, based on the sectors they operate in, an investment sum is attributed to highly and very highly dependent ecosystem services. This is done by using data from the WorldScope database on the sectors each company are operating in, and data from ENCORE which matches business activities to their dependence on specific ecosystem services.

We found that the total investment in highly and very highly dependent companies is €469 million out of the total listed equity investment of € 3.3 billion. This share of investment reflects 68 of the 200 companies in which ASN Impact Investors has a shareholding. The most common highly and very highly dependent ecosystem service is ground water. 44 out of the 68 companies are either highly or very highly dependent on this ecosystem service. Ground water as an ecosystem dependence is four times as large as the next most common, climate regulation (11 out of the 68 companies) and more than 4 times as large as the third most common ecosystem service dependency, water flow maintenance (9 out of the 68 companies).

1 Introduction

1.1 Background: conducting a biodiversity footprint

ASN Bank has set a target to have an overall net-positive effect on biodiversity in 2030. Therefore, ASN Bank wants to understand what impacts their investments have on biodiversity: the biodiversity footprint of the investment portfolio. ASN Bank and other financial institutions can use the information from a biodiversity footprint to assess what steps are needed to avoid or minimize negative impacts and optimize avoided or positive impacts, thereby working towards a no net loss of biodiversity or a net positive contribution.

Impacts on biodiversity can be measured and expressed as a biodiversity 'footprint'. With an annual biodiversity footprint analysis, ASN Bank monitors changes in expected biodiversity through time. This assessment is based on the contribution of an economic activity to drivers of biodiversity loss or gain, like land use and land transformation or climate change. In the case of a biodiversity footprint for financial institutions, the footprint may focus on the impact of the financial institution itself (for example impacts resulting from land use and energy use by a bank's buildings) as well as the impact of the economic activities in which financial institutions invest. However, the impact of land use and energy use of ASN Banks' offices will be negligible compared that of the economic activities supported by the loans and investments. For this reason, the footprint focuses on the biodiversity impact of loans and investments.

A biodiversity footprint is in many ways similar to a carbon footprint. Both footprints look at the impact resulting from environmental pressures caused by economic activities. However, in a biodiversity footprint, more environmental pressures are included, like land use and water use, than in a carbon footprint, which only focuses on greenhouse gas emissions. A biodiversity footprint therefore takes into account a broader set of environmental impacts, compared to a carbon footprint.

There are more significant differences:

1. It is relatively clear what should be measured when looking at climate change. The IPCC agreed on measuring Global Warming Potential expressed in CO_2-equivalents. For biodiversity however, there is no agreed metric yet; one could measure species richness or species abundance, but there are more ways of quantifying biodiversity impact.
2. Greenhouse gas emissions have a global impact regardless of the location of the emission. The resource use and emissions with impacting biodiversity often have a localised effect.
3. Most companies already report on GHG emissions so data can be found in many corporate reports, statistics, and databases. For biodiversity impact, data is scattered over many sources and important pressures, like eutrophication or ecotoxicity, are difficult to quantify.

Therefore, this biodiversity footprint comes with limitations, and it should be interpreted with care.

Limitations of the footprinting methodology and data

Important to note: The footprint calculation has its limitations, both from a methodological viewpoint and from a data viewpoint. For example, the introduction of invasive species is considered an important driver of biodiversity loss but cannot be included in footprint calculations yet. Depending on the relevance of this driver in the sectors in which the financial institution invests, the actual footprint could be much higher (more negative).

Moreover, a large part of the footprint calculation is based on 'background data', in many cases country-specific sector average environmental data from databases. This is therefore not the actual environmental data of an individual company. This also means that best practices of individual companies are not reflected in the footprint, neither is the result of ASN Bank's investment criteria (like the FSC requirement for forestry related sectors). Ways to improve the footprint calculations are still being explored. This includes taking into account investment criteria, like certification requirements.

These limitations mean that the interpretation of the footprint result should be done with care and may require 'zooming in', i.e. looking in more detail at the 'impact hotspots'. The qualitative analysis was conducted in order to assess the limitations of the footprint methodology used and enable a correct interpretation of the results. This analysis is added in a separate annex report.

Use of a biodiversity footprint

Important to note: Conducting a biodiversity footprint is not an objective in itself. A biodiversity footprint supports ASN Bank in its understanding of the relations between its investments and loans and (impacts on) biodiversity.

A biodiversity footprint can be used to:

1. Understand how investments impact biodiversity: what are the impact hotspots and why?
2. Understand what can be done to avoid or minimise negative impacts.
3. Understand how investments can lead to avoided impact negative or even positive impact.

So you can:

1. Develop or fine-tune a biodiversity policy and investment criteria.
2. Engage with investees on biodiversity.
3. Use a biodiversity policy to contribute to goals on climate, water and the SDGs.

In order to:

1. Manage financial risks resulting from biodiversity impacts and dependencies.
2. Show clients and stakeholders how potential biodiversity impact hotspots are managed.
3. Achieve ESG objectives.

The mitigation and conservation hierarchy

To reach a net gain for biodiversity on a portfolio level by 2030, ASN Bank will need to identify ways to minimize negative impacts on biodiversity and ways to contribute to avoided and positive impacts. The so-called 'mitigation hierarchy' (see figure 3), can guide the bank's decisions in reaching this net gain. The mitigation hierarchy shows that a first step should be to avoid negative impact, followed by minimizing and restoring negative impact, before compensating ('offsetting') any remaining negative impact.

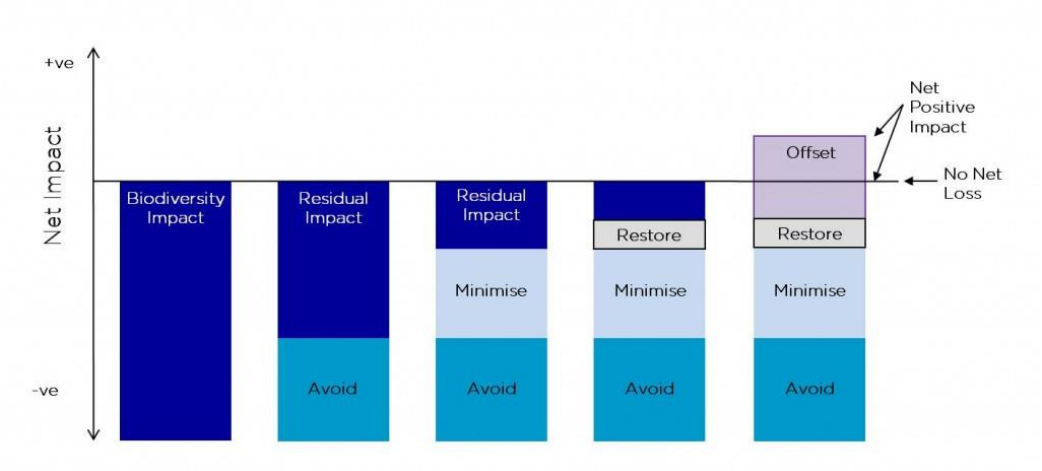

Figure 3: Mitigation Hierarchy (source: The Biodiversity Consultancy)

At ASN Bank, many investment criteria are already in place with regard to avoiding impact (e.g. exclusion criteria for industries like fossil fuels, heavy industry, mining, and agriculture). Impact is also minimized using investment criteria, such as requiring FSC certification in case of forestry. Investments with a positive impact, or an avoided negative impact on biodiversity, like investments in green energy, nature restoration, and green project funds, can be used to compensate for the remaining negative impact of ASN Bank's investments and reach a net gain situation (note that avoided impacts can be used to reach a no net loss, but positive impacts are needed for a net gain).

1.2 Dependencies on ecosystem services

An ecosystem dependency describes the dependence of business operations on a certain service that the ecosystem provides. For example, a beverage company may be very highly dependent on the service provided by ground water to provide drinking water supply to its operations. Ground water controls the quality and quantity of water reaching aquifers. This affects the entire local and regional water cycle and therefore presents a risk to a business's operation should it be ill-maintained or overused. The ENCORE database provides data on the materiality of dependencies by linking business activities to specific ecosystem services.

Combining a biodiversity footprint and an ecosystem services dependency profile shows two different sides of our relationship with nature: our impact and our dependency. If you know your impact, you can reduce it. If you know on which ecosystem services your company relies, you can investigate if the ecosystem service is under threat and if it can become a risk for your operations. The intention of integrating dependencies on ecosystem services in the BFFI method for biodiversity impact assessment, is to develop a method which not only provides a biodiversity impact score & profile, but also an ecosystem services dependency score & profile. The extra value to financial institutions is obvious: the BFFI will not only show where the biodiversity impact

hotspots are located in an investment portfolio, but also where in the investment portfolio dependency hotspots are located.

Recent research by the Dutch Central Bank (DNB) and PBL Netherlands Environmental Assessment Agency has shown that the dependency on ecosystem services like pollination may indeed pose a significant risk to the Dutch financial sector ('Indebted to nature; Exploring biodiversity risks for the Dutch financial sector', June 2020). The DNB/PBL research used sector-specific dependency data from the ENCORE knowledge base, developed by the Natural Capital Finance Alliance ('NCFA'; consisting of Global Canopy, UNEP Finance Initiative, UNEP-WCMC). A standard approach for assessing the dependence on ecosystems services has not been developed yet. To make the integration of dependencies in the BFFI a reality, an analysis is made of the data need and data availability and the ways in which these data can be added to the BFFI methodology. The resulting method has been piloted by calculating a biodiversity impact and dependencies score of the 25 constituents of the AEX (Amsterdam stock exchange) index. This index includes stocks of 25 companies with the biggest market capitalization on the Amsterdam stock exchange (Kan et al., 2021)[1].

A similar procedure for ASN Impact Investor's listed equity is followed in this report. The results of this analysis can add value to ASN's investment strategy by identifying the natural resources that the business is dependent on, presenting a risk when these resources are not maintained. Based on the information provided, ASN may decide to invest in equity with low ecosystem services dependence and identify whether the ecosystem services businesses depend on are abundant or scarce, thereby judging the risk of the investment.

1.3 For the reader

In chapter 2, the main results of the biodiversity footprint are presented and briefly discussed. In chapter 3 the main conclusions are drawn, and several recommendations are made concerning the use of the footprint results and the footprint methodology. The detailed calculations are made available in a separate spreadsheet, containing the biodiversity impact assessment for each individual loan or investment. In this main report, the results from 2020 and 2019 are discussed.

There are four Annex reports:

- Annex A with the biodiversity footprint results from 2016-2020.
- Annex B, a qualitative analysis which focuses on impacts which cannot yet be covered by the quantitative calculation and serves as an interpretation guide.
- Annex C, explaining the calculations steps and specific procedures per asset class.
- Annex D, providing background information on the ENCORE database.

[1] Kan, D.M. Patel, R. Leach, K. Bekker, S. Dawkins, K. Broer, W. (2021) Biodiversity impact and ecosystem service dependencies. Integration of dependencies using the BFFI and ENCORE. 48 pp. PRé Sustainability, CREM, UNEP-WCMC, Ministry of Agriculture, Nature and Food Quality.

2 Results

2.1 Introduction

In this chapter, the results of the 2020 biodiversity footprint are presented. In section 2.2, the 2020 footprint of ASN Bank's balance sheet and ASN Impact Investor funds is presented and discussed. A comparison to the footprint results of 2019 is made in the sections 2.3 (for ASN Bank) and 2.4 (for ASN Impact Investors). In section 2.5, the analysis for the dependencies on ecosystem services is reported for listed equity in the funds managed by ASN Impact Investors (AII).

The footprint results for the years 2016-2020 are included in the annex 'Biodiversity Footprint 2016-2020'. A comparison with previous years should be made with caution, since improvements in the methodology and the use of more specific data can lead to different results.

This year, the results are reported slightly different from previous years:

- The 2019 results in this report differ from the 2019 results in last year's report. This is due to a methodological change in the calculation of financed emissions in the PCAF standard[2].
- The results per fund are different because of changes in the fund structure of ASN Impact Investors.

2.2 ASN Bank balance sheet and ASN Impact Investors

The following overview graph (figure 4) shows the total value of the investments on the ASN Bank balance sheet and the impact on biodiversity, grouped per asset class (each asset class has a different colour). The biodiversity footprint also shows negative values which represent an 'avoided' negative impact on biodiversity from renewable energy projects (including climate bonds). This avoided impact on biodiversity is mainly caused by avoided greenhouse gas (GHG) emissions from energy production using fossil fuels. Since climate change is one of the main drivers of biodiversity loss, the avoided GHG emissions lead to an avoided (negative) impact on biodiversity.

Mortgages and government bonds represent the majority of the financial value of ASN Bank's balance sheet (52% and 29% respectively). Most of the negative biodiversity impact is attributed to mortgages (26%), national government bonds (25%) and local government bonds (16%). This high impact is mostly caused by the size of the investments in these asset classes rather than the magnitude of the impact per invested euro.

Most avoided impact is achieved with investments in climate bonds (46% of all avoided impact) and wind energy (32% of all avoided impact). The climate bonds are investments in climate change mitigation or adaptation related projects, like energy efficiency projects or GHG reduction activities such as renewable energy projects. The impact is estimated using the average impact of renewable energy projects funded by ASN Bank.

[2] In the 2020 version of the Partnership Carbon Accounting financials, the enterprise value including cash (EVIC) instead of the market capitalization was used to calculate financed emissions. EVIC was selected as the attribution metric for listed equity and corporate bonds because it includes both equity and debt. More explanation on the rationale can be found in the report: PCAF (2020). The Global GHG Accounting and Reporting Standard for the Financial Industry.

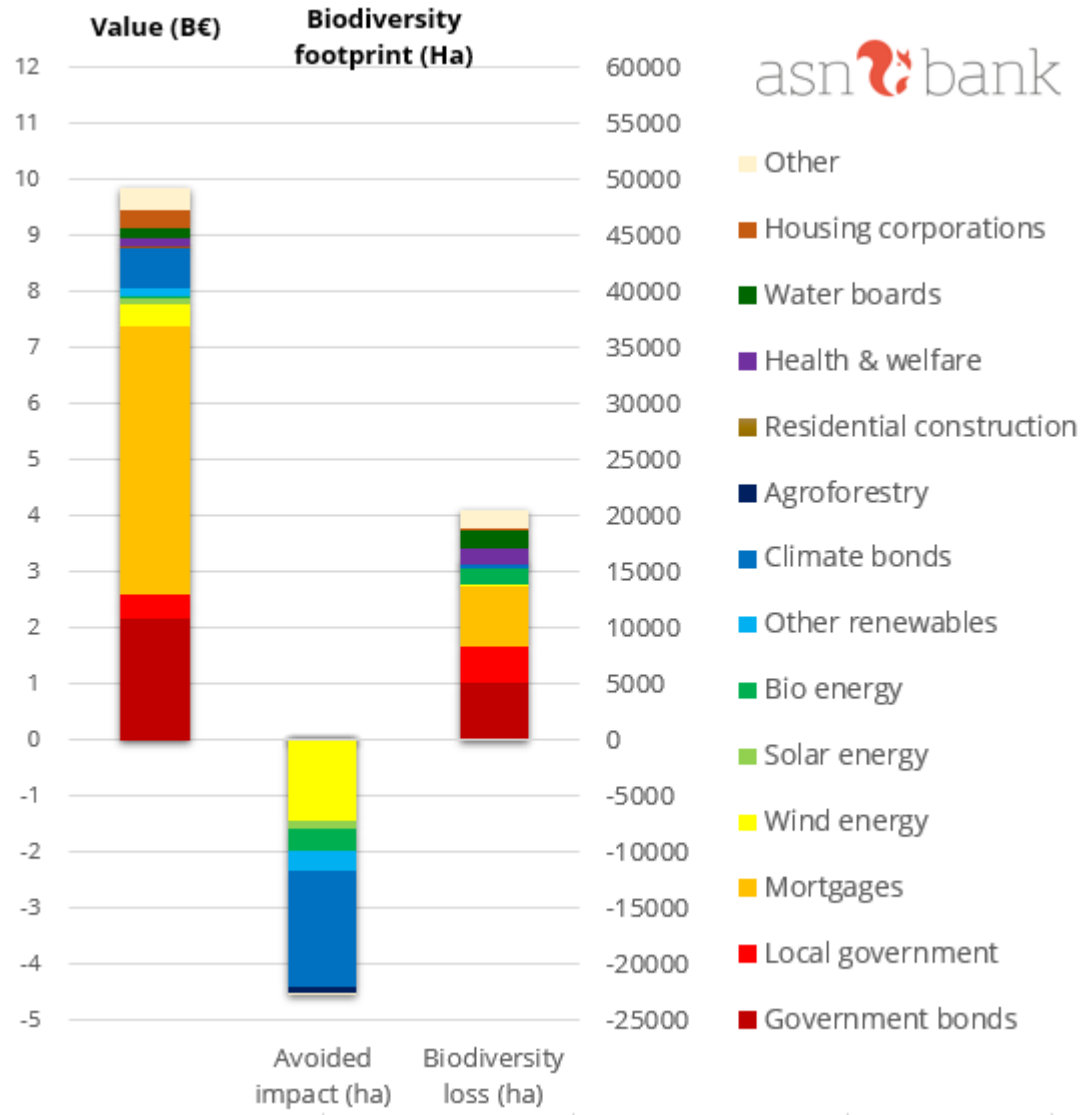

Figure 4: Total value and total biodiversity impacts of investments on the ASN Bank balance

ASN Impact Investor funds

For ASN Impact Investors, the biodiversity footprint results are reported per fund (see figure 5). The biodiversity impact of individual investments is available to ASN in a separate spreadsheet.

The two funds with the biggest financial value, "Duurzaam Aandelenfonds" and "Milieu & Waterfonds", also represent the biggest share of negative impact on biodiversity. However, large differences in impact are found between funds, between investments within funds and between equity securities. Most avoided impact (the negative impact below the line) is caused by investments in renewable energy. Both through direct investment in wind and solar projects, but also by investing in climate bonds. The climate bonds are investments in climate change mitigation or adaptation related projects, like energy efficiency projects or GHG reduction activities such as renewable energy projects. The impact is estimated using the average impact of renewable energy projects funded by ASN Bank.

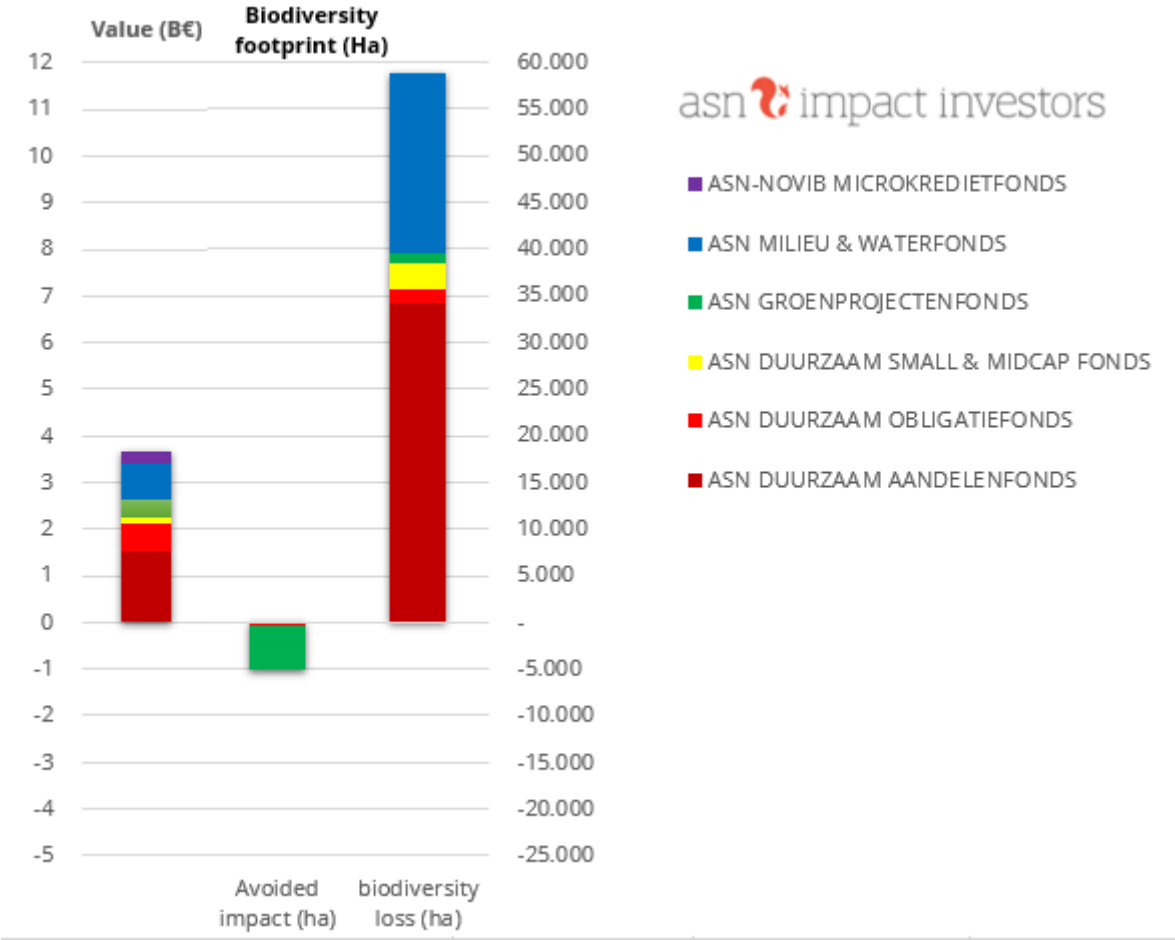

Figure 5: Overview of the size of investment categories and their biodiversity footprint of ASN Impact Investor funds. *For the ASN Microcredit Fund, no biodiversity impact was calculated due to a lack of data

ASN Bank balance sheet and ASN Impact Investor funds

The value of the ASN Impact Investor funds (3.4 billion euro), is lower than the value of all loans and investments (9.8 billion euro) on ASN Bank balance sheet. However, the net impact of all loans and investments of ASN Impact Investors, is much higher, 54 878 ha where all biodiversity is lost during one year. The net avoided biodiversity loss is 434 ha. The main reason for the relatively high impact of the ASN Impact Investor funds is the impact per euro invested. The average impact of equity is around 0.16 m^2 per invested euro, while the average (net) impact of loans and investments on ASN Bank's balance sheet is 0.0021 m^2 per invested euro. More detailed overviews are presented in paragraph 2.3 (ASN Bank balance sheet) and paragraph 2.4 (ASN Impact Investors).

When we look at the different drivers of biodiversity loss, we see that most biodiversity impact is caused by four drivers: land use, climate change, terrestrial acidification and water scarcity (see also the 'heatmaps' in paragraph 2.3.4 and paragraph 2.4.2). To understand what companies or sectors have the highest impact and where in the supply chain this impact takes place, a more detailed analysis would be needed. Such an analysis is not part of this footprint.

The total estimated net impact for ASN Bank balance sheet and the ASN impact Investor funds was 583 km^2 in 2019 and 516 km^2 in 2020. This is around 0.045 m^2 per euro invested in 2019 and 0.039

m^2 per euro invested in 2020. There are two main reasons for the lower impact per invested euro in 2020 compared to 2019

1. More avoided impact was achieved because the investments in renewable energy projects and climate bonds increased compared to 2019.
2. The average impact from investments in equity was slightly lower in 2020 compared to 2019.

In order to give the total biodiversity footprint with a value of 516 km^2 some tangible meaning, it is approximately the size of the Spanish island Ibiza (shown in figure 6). The results in m^2, ha or km^2 are derived from the unit PDF.m^2.yr. It is a multiplication of the potentially disappeared fraction of species (PDF), in a certain area, during a certain time. We only know the combined effect. For easier interpretation we have set the PDF to 100% (all biodiversity is lost), and the time to 1 year (to match the reporting period). This results in a net biodiversity footprint of all loans and investments of ASN Bank and ASN Impact Investors of 516 km^2, where all biodiversity is lost for one year. It is important to keep this interpretation step in mind when communicating on the footprint. An impact of 516 km^2 where all biodiversity is lost for one year is an indicative unit which enables ASN Bank to compare investments, to compare sectors and companies and to monitor the bank's progress towards its goal. It is not an exact number of the area size and percentage of species affected.

Figure 6: The net biodiversity footprint of ASN Bank and ASN Impact investors is 516 km^2, where all biodiversity is lost for one year. This is roughly the size of the Spanish island Ibiza

2.3 Footprint ASN Bank balance sheet: 2020 versus 2019

2.3.1 Overview

Changes in investments

Figure 7 shows relatively small changes in the size of investments on the ASN Bank balance sheet for most investment types. Investment in government bonds is decreasing, and investments in wind energy, climate bonds and other renewable energy are increasing. Mortgages and government bonds make up the majority of the portfolio.

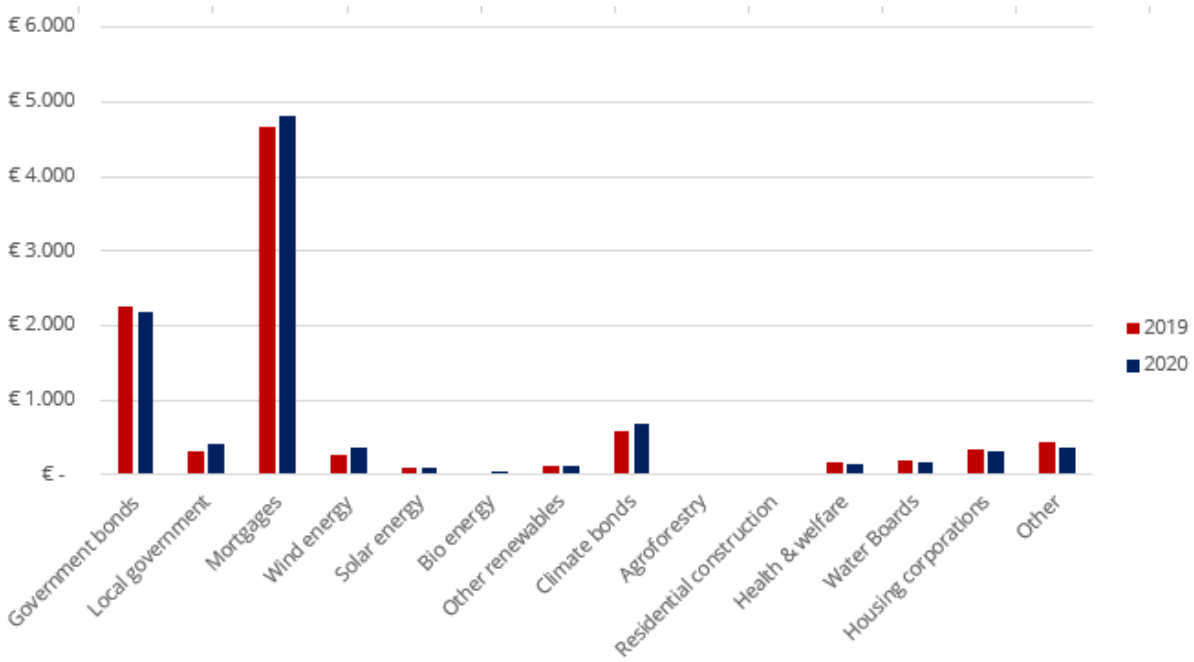

Figure 7: Changes in the investment portfolio (total investment in M€) 2019-2020

Changes in total net impact

In 2020, the total net biodiversity impact is lower compared to 2019 (see figure 8). For 2019, the net impact was 3154 ha biodiversity loss and in 2020, there is a net avoided biodiversity loss of 2057 ha. In 2020, the biodiversity loss was 20 514 ha and the avoided biodiversity loss was 22 571 ha. This can mainly be attributed to an increase in investments in renewable energy projects and climate bonds and a decrease in investments in government bonds. In 2019, the total amount invested in renewable energy projects and climate bonds was 1.11 billion euros whereas in 2020, this increased by 22% to 1.36 billion euros. The investments in national and local government bonds remained almost constant, totaling 2.57 billion euros and 2.59 billion euros in 2019 and 2020 respectively. Investments in government bonds and mortgages are the main contributors to biodiversity loss.

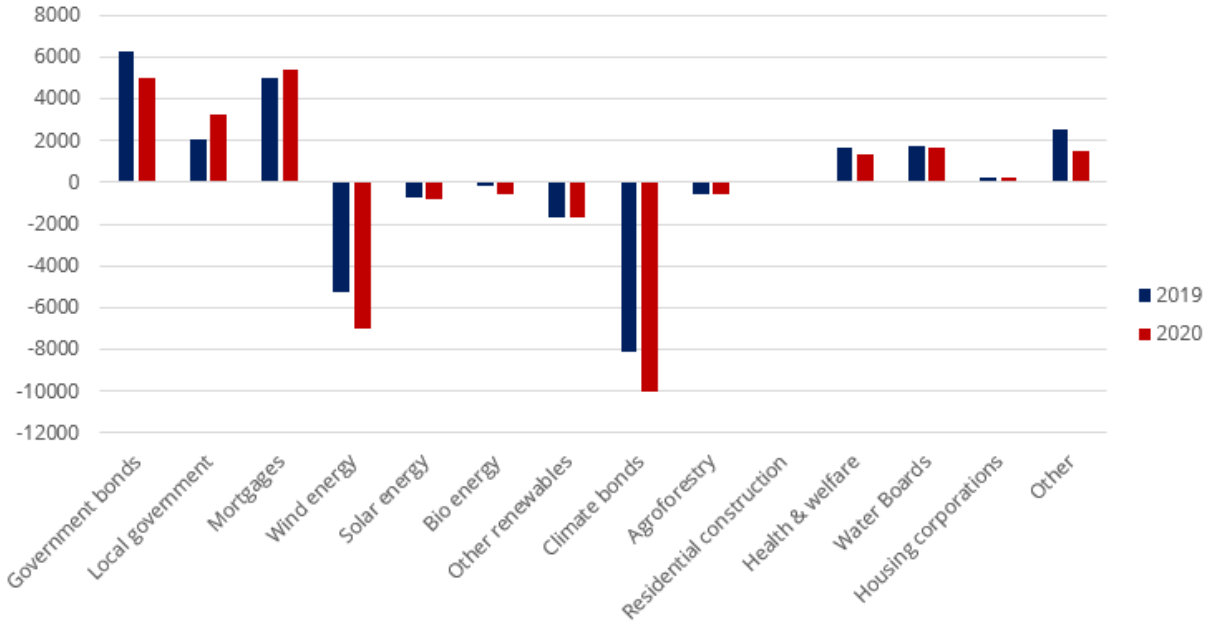

Figure 8: Net biodiversity impacts in hectares per investment category 2019-2020

Changes in impact per euro invested (indexes)

When looking at the indexes in figure 9 (the impact on biodiversity per euro invested), the negative impact per euro invested of government bonds, mortgages, health and welfare and water boards stayed more of less the same. For residential construction, the impact per euro decreased by 34% in 2020 compared to 2019. The main reason for this is a modelling choice made by ASN Bank, earlier, the impact of residential utilities was allocated to the EXIOBASE sector for construction. Now, in line with the carbon accounting approach, this impact is allocated to the mortgages. The rational to choose mortgages for these categories, is that investments in social housing do not all directly link to the construction of new houses. Part of the activities of housing corporations concerns the maintenance of already existing houses, so the approach for mortgages would better match those investments.

The impact of energy production from biomass was calculated using the EXIOBASE dataset "Production of electricity by biomass and waste" in the Netherlands. This dataset contains a mix of different technologies, types of biomass and plant sizes. When more specific information on the biomass projects is available, a more precise calculation can be made in order to confirm whether the switch from negative impact to net-avoided impact is realistic. This information should include data on the use of wet and dry biomass, the type of dry biomass, the transport distance and the energy production technology.

The impact per euro invested in local government is higher compared to 2019 because new data on local government spending from 2020 was used.

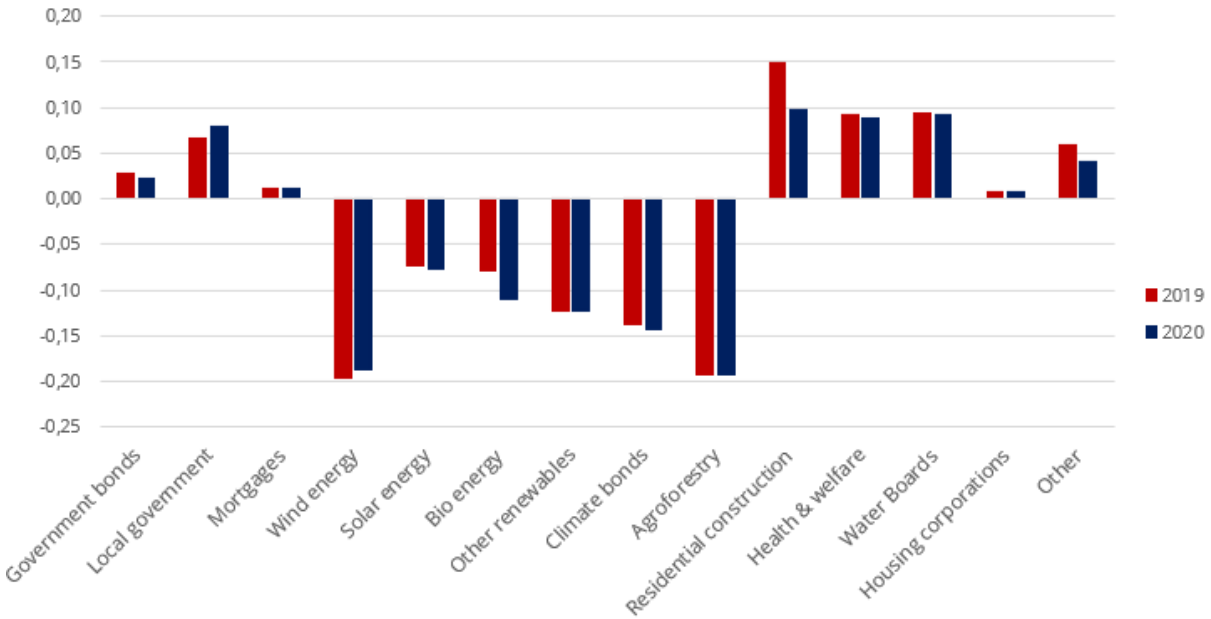

Figure 9: The ratio between investment and biodiversity impact in m^2/€ 2019 – 2020

2.3.2 Avoided impact from renewable energy projects

Currently, investments in renewable energy projects and climate bonds are the source of most avoided impact in the footprint of ASN Bank's balance sheet. Of the renewable energy investments, "climate bonds" has the highest avoided impact, followed by "wind energy," "other renewables" and "solar energy". The avoided impact for wind energy is higher than the previous years, due to a more precise way of calculating the impact (see below). "Climate bonds" are generally a mix of renewable energy projects and as far as data was available about this mix, they were modelled accordingly. "Other renewables" is mostly heat and cold storage; the impact has been calculated using the average data of all renewable energy projects, since heat and cold storage is not included as a separate sector in EXIOBASE.

NB: The avoided impact of renewable energy projects has the potential to change significantly. Avoided impact is calculated by assuming that power from solar and wind replaces power from other electricity generating technologies, like fossil fuels ('grey' electricity). These avoided emissions are calculated according to the 'Carbon Profit and Loss Methodology'. In this methodology, first the impact from renewable energy projects is calculated. Second the impact from electricity generation using the average grid mix in a country is calculated. As the share of more sustainable electricity generation in the grid mix is likely to increase in the future, the calculated avoided emissions will decrease. This means that the benefit of investing in wind and solar energy will slowly decrease over time, since these sources become more mainstream.

More precise calculations for wind energy projects

For all wind energy projects of ASN Duurzame Financieringen, a project specific calculation was made using actual installed capacity, investment and annual electricity production. In previous years, the country average installed capacity per invested euro was used, as well as a country average capacity factor to calculate the expected annual electricity production.

The following chart (figure 10) shows the differences in impact per invested euro between the wind parks. The results are split by environmental pressure (the drivers of impact on biodiversity). Above the X-axis the negative impact from the construction of the wind park is shown. This impact is very limited compared to the avoided negative impact resulting from the replacement of 'grey' electricity (below the X-axis). The differences in impact between the wind energy projects is the result of the installed capacity per invested euro, the annual electricity production and the national grid mix where the park is located. Since these parameters can differ significantly, the impact per invested euro can differ by a factor 2.

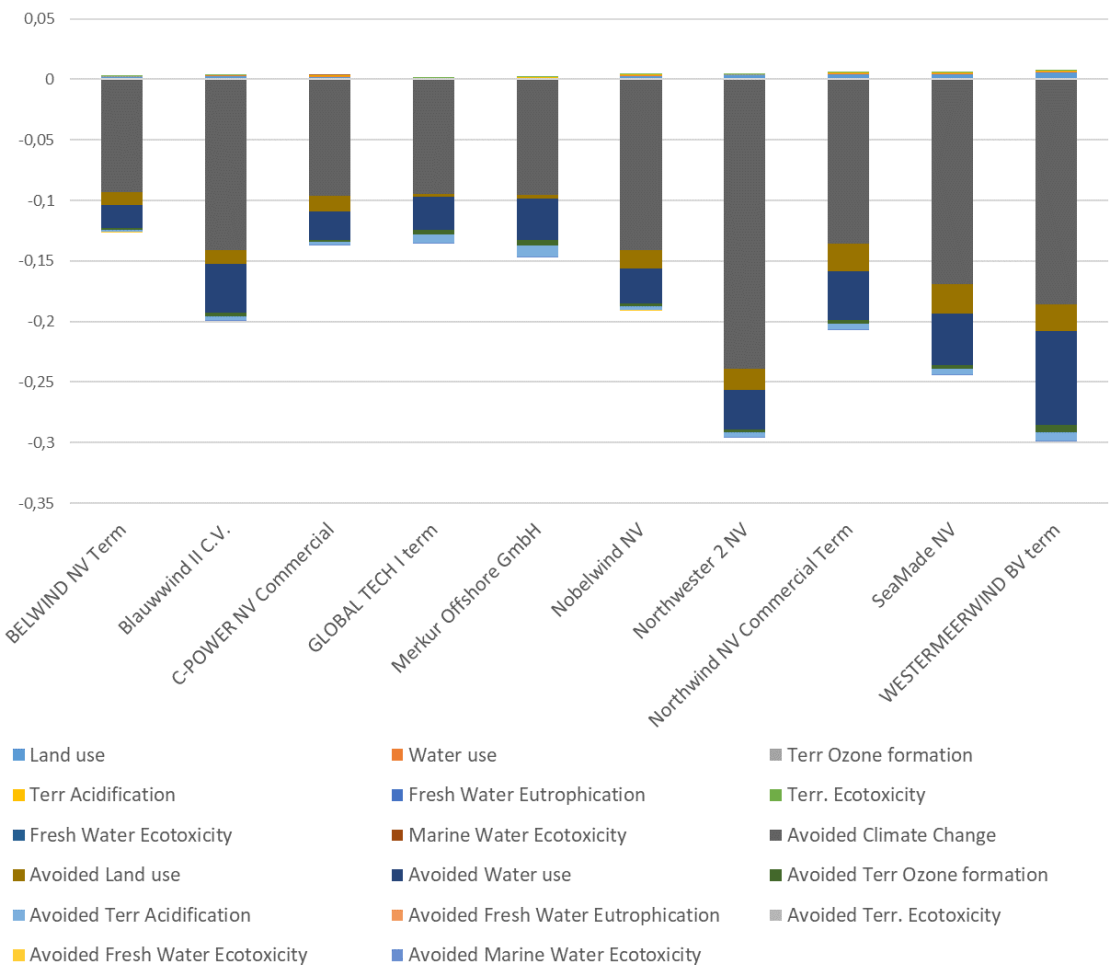

Figure 10: Biodiversity Impact by driver, per wind energy project, in m2 per invested euro.

2.3.3 Investments in (agro)forestry

Since last year, the impact from "Agroforestry" has also been calculated. The calculations are based on the land use change resulting from agroforestry projects. The potential gain in biodiversity largely depends on the previous use of the land and the resulting type of agroforestry. The methodology to calculate the impact of agroforestry and forestry projects was developed in a separate project. The methodology is based on scientific data regarding the level of biodiversity in different land use systems and forestry management types. Investments in agroforestry and forestry can be used to compensate for (remaining) negative impact of ASN Bank's investment portfolio, following avoidance, minimisation and restoration of negative impacts (see the mitigation hierarchy).

2.3.4 Biodiversity impact heatmap ASN Bank balance sheet

Based on the impact calculations for the different loans and investments on the ASN Bank balance sheet, a 'heatmap' can be developed showing what asset classes lead to a negative or positive/avoided impact, the significance of this impact (indicated by colors) and the drivers of biodiversity loss ('impact categories') responsible. See figure 11.

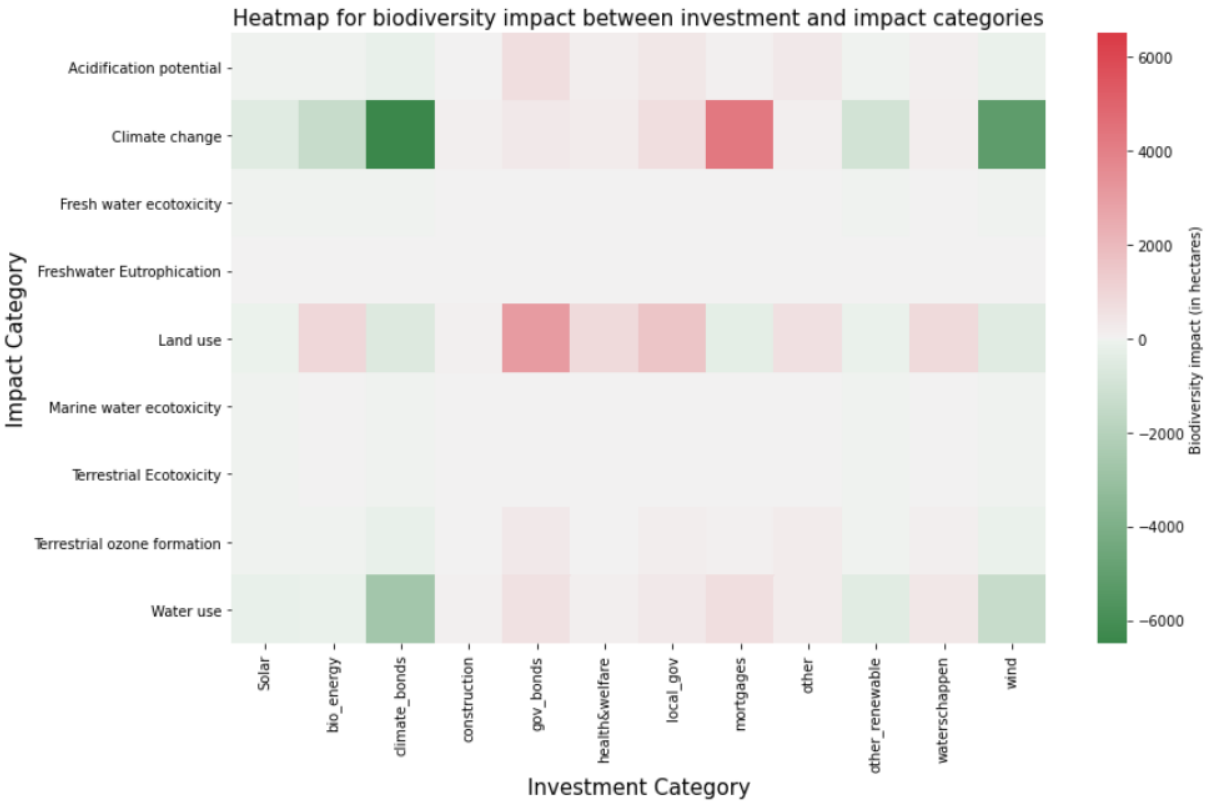

Figure 11: Heatmap for biodiversity impact for ASN Bank balance, linking investment types, to pressures causing biodiversity loss or avoided biodiversity loss

The heatmap shows that the climate change impact of mortgages causes the highest biodiversity loss. Land use resulting from government bonds also causes a relatively high biodiversity loss (color dark red). This impact is more than 4300 ha (where all biodiversity is lost during one year)

for the climate change impact of mortgages and around 3100 ha for land use impact of government bonds. Investments in climate bonds and wind parks show a relatively high avoided impact (dark green), due to a reduction of climate change.

2.4 Footprint ASN Impact Investors: 2020 versus 2019

The following sections contain an analysis of the biodiversity impact off ASN Impact Investors. Since this year, the dependencies on ecosystem services were also analyzed using the ENCORE database. An overview of the findings can be found in section 2.7.

2.4.1 Overview

Changes in investments

The total value of the investments of ASN Impact Investors increased slightly from M€ 3373 to M€ 3421, mostly in the ASN Duurzaam Aandelenfonds and the ASN Milieu & Waterfonds. The total value per fund is shown in the figure below. An important change is that the MIX funds were removed and the investments in MIX funds were allocated to the remaining funds. The results were recalculated for 2019 based on the new fund structure.

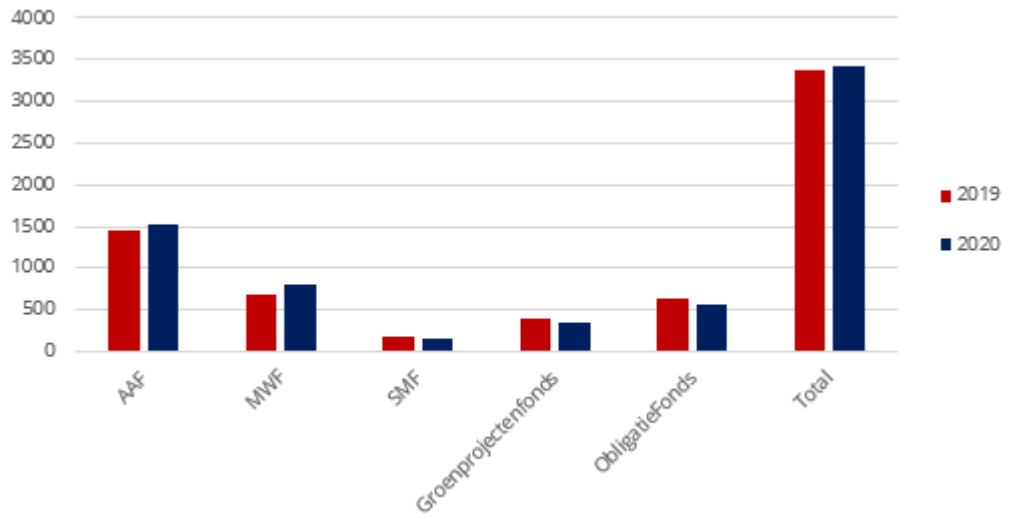

Figure 12: Changes in the investment portfolio (total investment in M€) 2019 -2020

Changes in total net impact

The two funds with the biggest financial value, “Duurzaam Aandelenfonds” and “Milieu & Waterfonds”, also represent the biggest share of the negative impact on biodiversity (see figure 13). The impact of different funds and of investments within funds differs. For example, large differences can be found between equity securities. These differences can be explained by the type of economic activities the companies are involved in. For instance, in agriculture and mining a high impact can be expected, but services generally have a lower impact. Most avoided impact is caused by investments in renewable energy, including direct investment in wind and solar projects and investments in climate bonds.

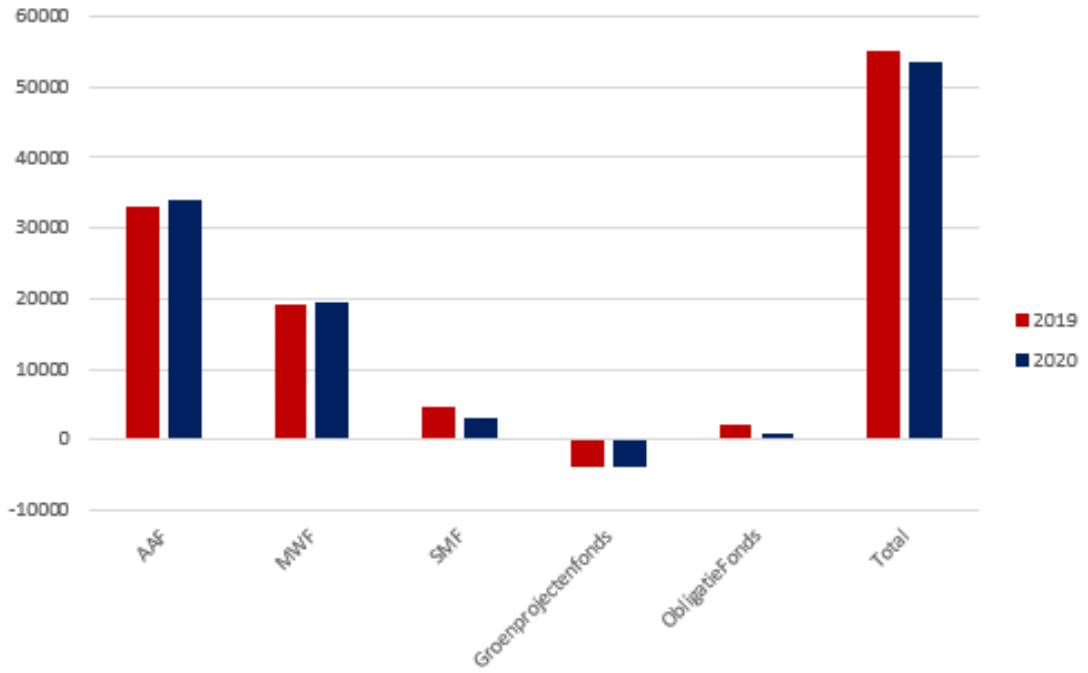

Figure 13: Net biodiversity impacts in hectares per fund 2019-2020

Since 2019, the total impact per driver of biodiversity loss is reported as well. The detailed spreadsheet with the results of individual investments contains the impact per driver for each investment. Also, a heatmap summarizing the results can be found in figure 11 (for ASN Bank), and in figure 15 (for ASN Impact Investors). This overview shows that most biodiversity impact is caused by land use, climate change and water use. A more detailed analysis of the results per company would be needed to pinpoint where in the supply chain the most significant impact originates (not part of this footprint).

The two figures (figure 12 and figure 13) show that the value of the ASN Impact Investor funds is relatively low compared to the total value of assets on the ASN Bank balance sheet. The total net impact on biodiversity, however, is much higher. The reason for this is that the average impact of investments in equity is much higher than the average impact of investments in government bonds and mortgages, which make up the largest share of the balance sheet of ASN Bank.

Changes in impact per euro invested (indexes)

In the figure below, the impact per invested euro is provided. The differences between funds and between years can be explained by many factors. Most important is the sector in which the companies in the fund are active. For individual investments, also the enterprise value compared to the revenue is important. This is a methodological issue: the attribution of impact for investments in companies with a high revenue and a low enterprise value is relatively high. The reason for this is that an investment of one euro in a company with a low enterprise value results in a larger 'share of ownership' of the company. This means that a larger part of the total footprint of the company is attributed to the investment of one euro.

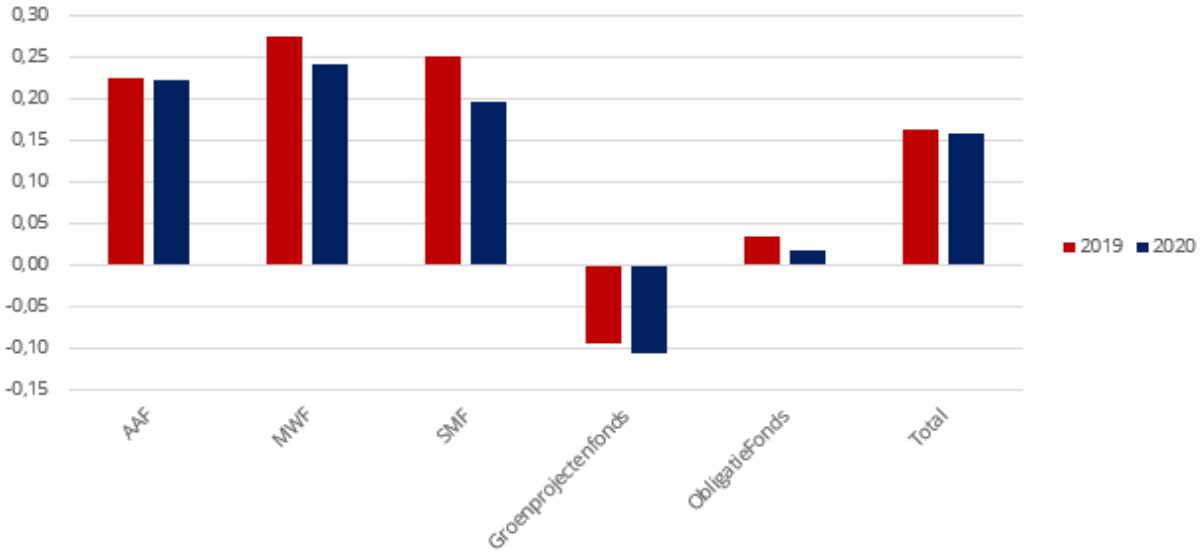

Figure 14: The ratio between investment and biodiversity impact in m^2/€ 2019 – 2020

The relatively high impact (per euro invested) of equity compared to investment in mortgages and government bonds is due to the nature of the investments. For mortgages for instance, a relatively large loan is provided while the impact of this loan (based on annual residential energy use) is relatively small. In case of government bonds, only a fraction of the government spending is attributed to ASN Bank.

2.4.2 Biodiversity impact heatmap ASN Impact Investor funds

Similar to ASN Bank balance sheet, the heatmap for ASN Impact Investor funds (see figure 15) shows that the impact category 'land use' has the highest share in the biodiversity impact. Other impact categories with a relatively high impact are climate change, acidification, and water use; other impact categories only contribute to a limited extent. ASN Duurzaam Aandelenfonds, mainly consisting of common stock investments, has the highest impact due to land use (more than 14000 hectares). In the ASN Groenprojectenfonds, the investments result in an avoided impact on biodiversity through avoided GHG emissions, reducing impacts linked to climate change. The avoided impact is more than 2000 hectares (where a loss of all biodiversity during one year is avoided).

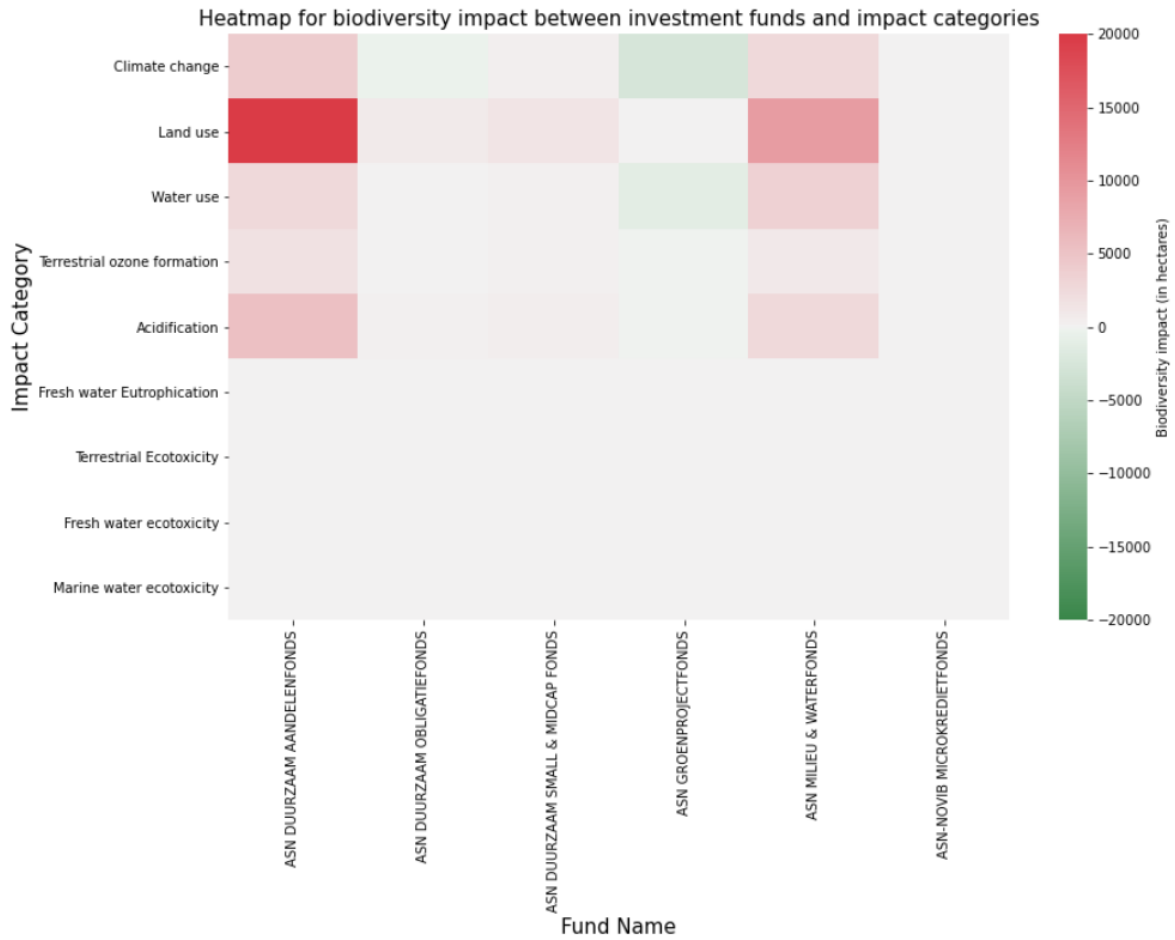

Figure 15: Heatmap for biodiversity impact for ASN Impact Investors, linking investment types, to pressures causing biodiversity loss or avoided biodiversity loss

2.4.3 Company-specific impact within funds

In the previous paragraphs the total impact of the different funds is presented. In this paragraph we zoom in to the main impact of the top 5 companies per fund. We can see that there are a few companies with a large share of biodiversity impact compared to their financial value. For these companies a detailed analysis should be made of the following characteristics:

1. The drivers of the biodiversity impact.
2. Where in the value chain most impact occurs.
3. Whether all expected positive and negative impacts could be quantified in the footprint.
4. If the data model used is a good fit with the activities of the companies.
5. How the footprint limitations can affect the footprint result.
6. Whether the companies have policies in place and take action to address the impact, focusing on the main drivers of this impact according to the footprint.
7. If and how such actions could be included in a footprint calculation.

The analysis of ASN's funds reveals that ASN Duurzaam Aandelenfonds and ASN Milieu & Waterfonds account for more than 60% of the negative biodiversity impact within ASN funds. This biodiversity impact can largely be attributed to the land use of the most companies concerned.

Table 1 below shows the biodiversity loss in hectares allocated to ASN due to its shareholding in specific companies within the ASN Duurzaam Aandelenfonds. As shown, there is little correlation between the share of value in the fund as a whole and the share of impact within the fund. This means that the contribution of these companies to the total impact of the fund can largely be attributed to the business operation of the specific company.

Table 1: Companies in the ASN Duurzaam Aandelenfonds, the shares of these companies in the total value and total impact of the fund and the impact in hectares

Company descriptor	Share of value	Share of impact	Total hectares
Private healthcare provider	0,6%	8,3%	2844
Software services provider	0,6%	4,8%	1644
Global packaging manufacturer	0,2%	4,5%	1531
Global paper packaging manufacturer	1,1%	4,4%	1511
Automotive technology company	0,7%	4,1%	1397
Total	**3%**	**26%**	**8927**

Table 2 below shows this biodiversity loss for ASN Milieu & Waterfonds. As shown, almost 41% of the impact of this fund can be attributed to just five companies. The production of packaging, pulp and paper requires a lot of land use, significantly contributing to biodiversity impact. The production of plastic and metal products requires energy intense extraction and processing stages which traditionally make use of fossil fuels thereby contributing to climate change and an impact on biodiversity.

Table 2: Companies in the ASN Milieu & Waterfonds, the shares of these companies in the total value and total impact of the fund and the impact in hectares

Company descriptor	Share of value	Share of impact	Total hectares
Reusable pallets, crates and containers	2,2%	10%	1910
Global packaging manufacturer	1,9%	9%	1743
Global paper packaging manufacturer	2,1%	8%	1601
Environmental utility infrastructure company	2,6%	8%	1488
Wood-based fibers producer	2,1%	6%	1197
Total	**11%**	**41%**	**19424**

The top 5 companies of each fund should be analysed in more detail using the following steps.

1. Check the WorldScope data on revenue by sector and region
2. Check if the sector attributed by WorldScope matches the activities from the company
3. Check the WordScope – EXIOBASE mapping to see if the EXIOBASE sector matches the activities from the company
4. Analyse the environmental emissions linked to the SECTORS in EXIOBASE
5. Check the characterisation step in ReCiPe, to see if all flows are translated to biodiversity impact correctly for each pressure in the ReCiPe impact assessment model.
6. Perform a contribution analysis to see in detail where the impact is coming from.
7. Find out if the company is taking measures to mitigate these main impacts

2.5 Dependencies on ecosystem services

In this section, the ecosystem service dependencies in the investment profile of ASN are analysed. By looking at the share-holding profile in listed equities of ASN Impact Investors, an overview can be provided of the sum of investments with a high or very high dependency rating. This is done by using data from the Worldscope database about the sector of each company and data from the ENCORE knowledge base which matches business activities to their dependence on specific ecosystem services.

2.5.1 ENCORE knowledge base

ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure) enables users to visualise how the economy depends on nature and how environmental change creates risks for businesses (encore.naturalcapital.finance). Starting from a business sector, ecosystem service, or natural capital asset, ENCORE can be used to explore natural capital risks.

ENCORE offers the user a way to explore sector-specific dependencies on ecosystem services, the natural capital assets supporting the provision of these services and drivers of environmental change affecting service provision. For each natural capital asset and driver of environmental change, spatial data layers are provided to enable the exploration of location-specific risks. ENCORE does not provide an overview of the status of the ecosystem service itself (e.g. it does not include maps of pollination services), but instead shows:

- That the production of 'agricultural products' depends on a number of enabling ecosystem services, like 'soil quality', 'water quality' and 'pollination'.
- That the ecosystem service 'pollination' depends on the natural capital assets 'atmosphere', 'species' and 'water', including a subdivision of these assets for which spatial data are publicly available. For example, 'atmosphere' is divided in 'Change in Precipitation Seasonality', 'Change in Temperature Seasonality' and 'Change in Wind Speed'.
- The drivers of environmental change potentially affecting the service, like 'droughts', 'flooding' and 'habitat modification'.
- Spatial data layers (maps) on these natural capital assets and drivers.

Further detail about the coverage of sectors, sub-industries and ecosystem service categories can be found in ANNEX D. Detail is provided on the dependency of production processes on ecosystem services and how material these dependencies are.

The materiality rating is based on:

1. how significant the loss of functionality in the production process is if the ecosystem service is disrupted – limited, moderate, or severe
2. how significant the financial loss is due to the loss of functionality in the production process – limited, moderate, or severe.

The materiality assessment reflects both considerations. A *very high* materiality rating means that the loss of functionality is severe and that the expected financial impact is also severe.

For each ecosystem service, the natural capital assets that underpin this service are listed in ENCORE. As an example, for 'Fibres and other materials' it is stated that this service depends on 'Habitats' and 'Species'. In turn, these assets are influenced by 'Drivers of environmental change'. For example, 'Habitats' are vulnerable to, among others, droughts, fire, flooding and landslides. Finally, contextual information is provided for each driver of change and the effects it can have on natural capital assets and ecosystem service provision.

The analysis in this report is limited to an analysis of the dependencies on ecosystem services relevant to ASN's investments in equity. The step from dependencies to natural capital assets and drivers of environmental change (as presented above) is not included. The reason for not including these last two steps is that this analysis, at this stage, does not offer more insight in the investment risks. Further development of the ENCORE knowledge base in the years to come may change this.

2.5.2 Overview of ecosystem service dependencies

The analysis of ecosystem service dependencies can be done on a company or portfolio level. As a first step, this analysis is done on the portfolio level. This analysis will show where dependency hotspots are located within the investments in listed equities from ASN Impact Investors. It also shows what type of ecosystem service dependencies occur most in the portfolio. Moreover, it enables an in depth look at direct dependencies in the portfolio and compare dependencies between companies.

A company can depend on a number of ecosystem services for its core operations. These dependencies are related to the business activities and the sector in which the company operates. Data from WorldScope details the sectors that a company operates in and its respective revenues. These sectors are translated through industry codes into an EXIOBASE format where these business activities can be linked to ecosystem services. This analysis only focusses on the ecosystem service dependencies rated as high or very high materiality.

The total investment in companies depending on ecosystem services with a high and very high materiality is €469 million out of the total listed equity investment of € 3.3 billion. As a total of ASN's Impact Investor listed equity portfolio, this comes down to 14% of all investments in listed equity. This share of investment reflects 68 of the 200 companies in which ASN Impact Investors has a shareholding.

The 68 companies with one or more dependencies of high or very high materiality mainly operate in the following areas (by order of most occurring sector):

1. Production of leisure or personal products
2. Distribution
3. Production of paper products
4. Water services (e.g. waste, water treatment and distribution)
5. Catalytic cracking, fractional distillation, and crystallization
6. Processed food and drink production
7. Railway transportation
8. Construction materials production
9. Mining
10. Tire and rubber production

Figure 16 illustrates, out of these 68 companies, on what ecosystem services with a high or very high materiality the companies depend. As shown, the most common ecosystem service is ground water which occurs in 44 of the 68 companies. The occurrence of ground water is almost four times higher than the next most common ecosystem service, climate regulation.

Ground water as an ecosystem service provides the services of water purification, water balance, mineral water, water storage and biodiversity to endemic species (Griebler C., Avramov M. 2014)[3] Further details on this ecosystem service, the underlying natural capital asset (water) and the benefit this ecosystem service brings (clean water) can be found in the ENCORE factsheet on ground water. Factsheets on climate regulation and water flow maintenance are also available on the ENCORE website.

[3] Griebler C., Avramov M. (2014) Groundwater ecosystem services: a review. The Society for Freshwater Science. https://doi.org/10.1086/679903

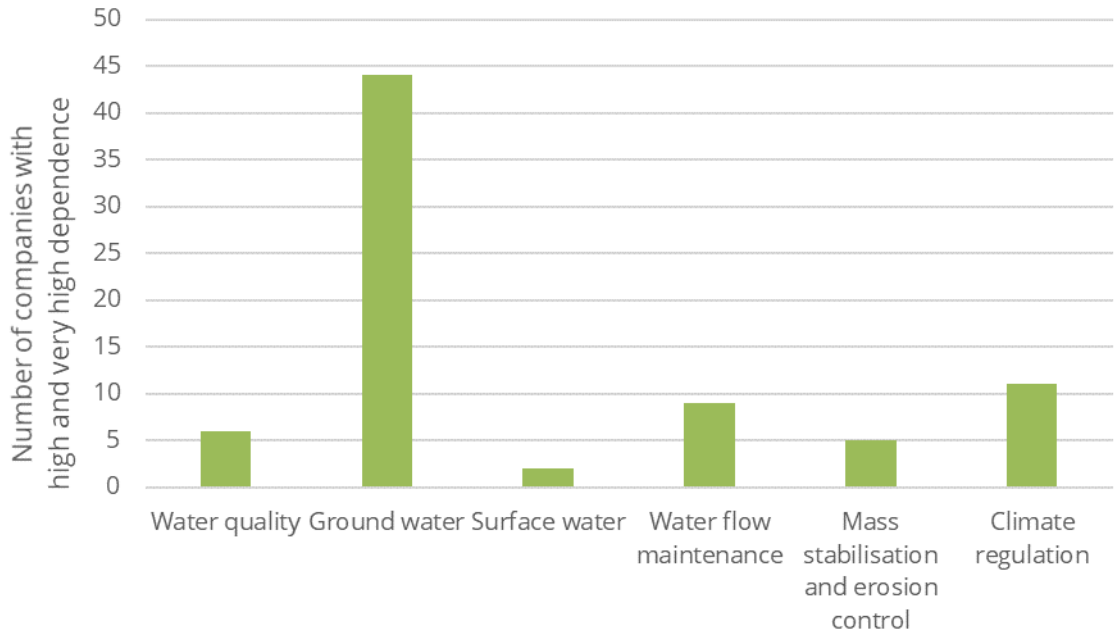

Figure 16: Number of ASN shareholding companies with high and very high dependence on specific ecosystem services

The dependencies per company (on ecosystem services of high and very high materiality) can be used to take a next step in a dependency risk assessment. A dependency on ecosystem services is not yet a financial risk as long as the service is not at risk. This means that ASN, in a next step, could:

1. Analyse where the companies with material dependencies are located.
2. Identify the state of the ecosystem services the company depends on at that location (stable, increasing, decreasing).
3. Investigate the way in which the company is managing its dependencies.
4. Decide whether the dependencies could result in financial risks.
5. Include the dependencies in the engagement with the company.
6. Decide what investments may need to be reconsidered from a dependency point of view.

Note that this analysis only focused on *direct* dependencies. Indirect dependencies occurring in the supply chains of companies invested in can also present a financial risk. Taking indirect dependencies into account might be considered in a future analysis.

3 Conclusions & recommendations

3.1 Conclusions

In 2020, the net biodiversity impact of ASN Bank and of ASN Impact Investors is slightly lower compared to previous years. The increase in avoided impact from investments in renewable energy and climate bonds, resulting from increased investments, plays an important role. For ASN Impact Investor funds, there is a slight increase in investments in equities, while the impact per invested euro is roughly the same with 0.16 m^2/€. The total net impact of ASN Impact Investors investments reduced slightly from 55 163 hectares to 53 662 hectares.

Since 2019, the influence of different impact drivers (like climate change and land use) is reported using 'heatmaps'. Land use, climate change and water use stand out as the most important drivers contributing to biodiversity loss. A more detailed analysis of the impact hotspots should be conducted to see where the impacts are located (what sectors and what economic activities and where in the supply chain) and what can be done to reduce the impact. Such a detailed analysis has not been conducted yet.

The ASN Duurzaam Aandelenfonds and the ASN Milieu & Waterfonds account for more than 60% of the negative impact of all funds. This should therefore be a strategic focus for the mitigation of negative impacts.

Around 14% of the investments in listed equity by ASN Impact Investors is invested in companies that depend on one or more ecosystem services with a high or very high materiality. Depending on the state of these ecosystem services in the areas where the companies are located, this could result in a financial risk. Further research is needed to see if this is indeed the case.

3.2 Recommendations

Negative impact
It is clear from the results that equities are the highest contributor to the biodiversity footprint, both per euro invested and in total net impact. The spreadsheet with detailed impact data shows that the variability of the impact per company is quite high, which indicates that a change in the equity portfolio can have a relatively large impact on the total impact score. It is also means that the use of more direct data instead and less sector average data could lead to significant changes when the companies invested in perform much better (or much worse) than the sector average. From this viewpoint is recommended to (1) have a closer look at the drivers of biodiversity loss for these companies, (2) to identify where in the supply chain these drivers play a role, (3) to analyse the steps these companies and/or the companies' suppliers have taken to address these drivers and (3) if these steps can be taken into account in the footprint. Moreover, the result of such an analysis can be used to inform the bank's investment criteria and company engagement. Note that the result of adjusted investment criteria and company engagement will only be reflected in the footprint when sector average data (now often the basis for impact calculations) are adjusted by adding company specific data.

The ratio between the main investment categories does not necessarily need to change; also, within an investment category, large differences and thus opportunities exist.
For mortgages, the main biodiversity impact is coming from GHG emissions. Assisting homeowners to reduce their energy consumption, provide funding for residential solar PV and assist with measure to improve the energy label will not only reduce climate change impact from mortgages, but also reduce the biodiversity footprint.

Avoided impact
For avoided impact, the largest share in total net avoided impact is related to climate bonds and renewable energy, mostly in wind and solar. Impacts from climate bonds is calculated using the same factors as for wind and solar projects. However, this benefit is mainly caused by the fact that such energy systems avoid impacts from traditional power plants. Under the Paris agreement these power plants will need to be replaced by non-fossil sources, which means that in the long run, this benefit will disappear. Wind and solar will likely become 'business as usual'. Although this also means that negative impacts from energy use will reduce across the whole portfolio, avoided or positive impacts will still be needed to compensate for residual negative impacts. Therefore, there is a need to explore the possibilities for biodiversity positive investments. The current focus on avoided impact is not enough to reach a future net gain. For more positive impacts, ASN Bank is now looking at investments in shade grown agriculture, forestry, and nature restoration.
The footprint shows that the highest avoided impact per invested euro comes from wind and (agro)forestry. The results for (agro)forestry should be interpreted with caution because these footprint calculations are currently only based on land use (change) and carbon sequestration, and it is based on two projects. However, these investments do show potential from a positive impact point of view.

Dependencies
The dependencies analysis shows that 14% of the investments of ASN Impact Investors in listed equity (68 out of 200 companies) has a dependency on ecosystem services of high and very high materiality. This means that if these ecosystem services deteriorate, the companies concerned may be at risk, posing a financial risk to ASN Impact Investors. From this viewpoint it is recommended to start a pilot in which the state of the ecosystem service most occurring (ground water) is analysed for (a selection of) the companies concerned. There are multiple databases available on water quantity and water quality to enable such a pilot, provided that the company locations can be traced (location data may be available from data providers like MSCI).

Footprint methodology
Regarding the methodology, we have a number of recommendations:

1. Interpreting the results
More attention should be given to the interpretation of the results. In the last two years, we made progress on the incorporation of databases containing the revenue per region and sector from listed companies. Now that we fully automated step 1 for listed equity, we should focus on improving the interpretation. A first step was taken in 2019 and 2020 by reporting separately on the influence of different drivers of biodiversity loss. The next step is to look in more detail at the companies with the highest impact. This allows us to further test the methodology and background datasets to see if the results can be explained, can be linked to a company's supply chains, can be improved from the viewpoint of accuracy and what actions can be taken. The latter step could

involve engagement, revision of investment criteria and/or divesting from certain sectors or sector specific practices (worst-in-class companies).

2. The linking of annual report revenue data to EXIOBASE sectors

Currently, the Refinitiv WorldScope database is used to automate the linking of company revenue data from annual reports to EXIOBASE datasets. This method does facilitate automated calculation, but there are limits to the data quality. Detailed analysis of the companies with the largest impact in the portfolio are needed to evaluate the quality of this linking step. Possibilities of other databases should be explored as well.

3. The translation of activities into emissions and land and water use data

For this project we use the EXIOBASE data to identify environmental inputs (resource use) and outputs (emissions) of economic activities. This open-source data is a very valuable input. We are in contact with some of the EXIOBASE consortium partners that are looking at update possibilities now. NTNU, the Norwegian University of Science and Technology has made a new version of EXIOBASE, with the base year 2015. As soon as this version is ready to be used, we will use it for the footprint. Also, we have joined the 'EXIOBASE club', a crowd funded project of our Danish SimaPro partner, LCA 2.-0 Consultants. This project aims to further develop EXIOBASE with more specified and more up-to-date data. We recommend using the new database as soon as it is available.

4. The translation from emissions, water-use, and land-use to biodiversity

The ReCiPe 2016 method we currently use will likely have updates in the future. There are also alternative methods, such as Impact World+ and GLOBIO. It is important that different methodologies use similar impact assessment principles (common ground). This development of common ground is currently being covered by the Partnership for Biodiversity Accounting Financials, and within several EU projects (like ALIGN). The results of these initiative will need to be integrated in the BFFI and the footprint calculations for ASN Bank.

5. Refining avoided impacts and positive impacts

Currently, the biodiversity footprint for financial institutions includes avoided and positive impacts from renewable energy, carbon sequestration projects, agroforestry, and forestry projects. The way the impact is calculated for these projects is still very rough.

In our efforts to improve the BFFI methodology, we will continue to actively contribute to, and monitor international developments in data, LCIA methods, and financial footprinting approaches. A continued effort is needed to build consensus between financial institutions and relevant stakeholders to improve biodiversity impact assessment approaches and facilitate the uptake of biodiversity information in financial decision making. Currently, PBAF is developing further standardisation of the way positive impacts are dealt with in biodiversity footprints for financial institutions.

6. Combining impact assessment modelling, with site specific methods

The calculated biodiversity impact of the BFFI is modelled with databases and an impact assessment method. When site specific measurements become available, the possibilities for combining modelled and measured data should be explored.