



Sustainable Investment Spotlight

Sustainable Investment Research, Bank J. Safra Sarasin
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Pesticides – efficiency booster or biodiversity killer?

The use of pesticides in farming is controversial. What exactly are their impacts?

Pesticides eliminate harmful pests ...

The word pesticide, derived from the Latin “pestis” (pest) and “cidium” (killing) refers to any substance used to combat organisms that damage food crops. Pesticides are classed into twelve categories, depending on the specific problem they target. The most common are herbicides (against weeds), fungicides (against fungal infection) and insecticides. The term is commonly used to refer to synthetic or chemical substances, but greener alternatives are also available for use in organic farming, such as copper, a natural fungicide. Depending on the dosage, however, these can actually be as harmful as their chemical counterparts. The main criteria for assessing the damaging effects of a pesticide include its water solubility, half-life and toxicity. These factors give an indication of how readily the pesticides spread, how long they remain in the ecosystem and how toxic they are. Pesticides are not only used extensively in agriculture, but in other areas such as industry and private homes. Around 4.1 million tonnes of pesticide are currently used every year worldwide, with herbicides making up almost half this volume. Farming accounts for about two thirds of pesticide use, with industry and households accounting for the remaining third.

...but with significant side-effects

Around 45 percent of annual crop production is lost through pests and disease. Pesticides are used in an effort to minimise these losses, but unfortunately tend to have side effects as well. Depending on their composition, pesticides can also harm beneficial soil organisms such as insects, worms or mycelium (beneficial fungus). Their destruction removes an important source of food for birds

and other species. One particularly controversial class of pesticides is the neonicotinoids, which are designed to attack insects' central nervous system. A report published by the European Food Safety Authority identified three substances that were harmful to bees, and these were subsequently banned in the EU. Pesticides can also be absorbed by plants or can run off from fields into lakes or rivers, disrupting their sensitive ecosystems. They can potentially leach into the groundwater. So there are many ways that pesticides can end up in the human food chain, and cooking, peeling or washing does not guarantee complete removal of chemical residues. The reported negative health effects include various types of cancer, respiratory problems and reduced fertility.



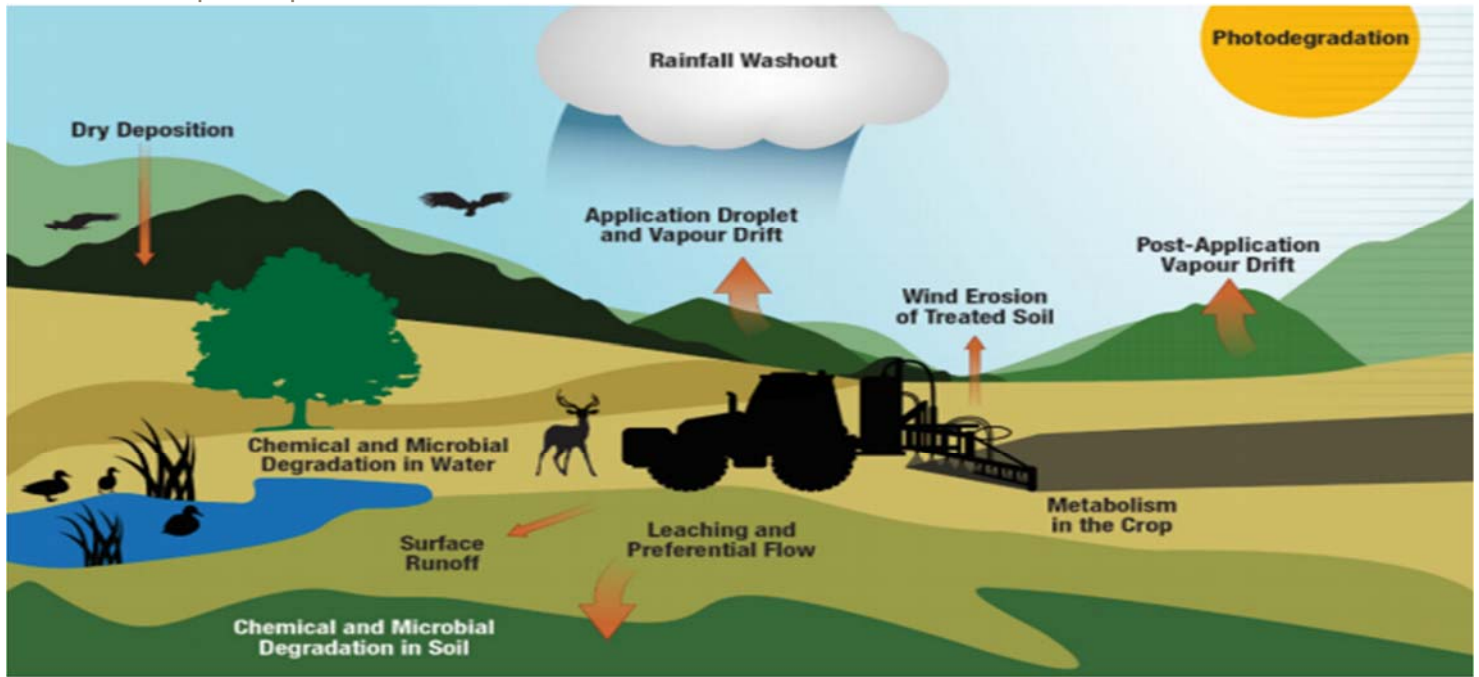
Editorial

Dear Reader

Around a million plants and species are currently threatened with extinction. The loss of biodiversity compromises the natural benefits provided by our ecosystem, such as pollination of fruit and crops by bees, or the provision of suitable drinking water through natural filtration or fresh air. The total value created by the ecosystem is estimated to be in the region of 33 trillion US dollars, equivalent to the combined GDP of the US and China. Agriculture is a major contributor to the loss of biodiversity, mainly through its overdependence on pesticides. Collateral damage to plants and species through pesticide use is unavoidable. Bank J. Safra Sarasin is already integrating these factors into its investment strategy to ensure it is well positioned to address future new challenges.

Benjamin Gränicher

Environmental impacts of pesticides



Source: Agriculture and Agri-Food Canada, 05.05.2021

The soil is teeming with life

The aggregate of organisms that live in the soil is known as edaphon. These organisms affect soil structure both directly, by burrowing through or breaking down organic matter, and indirectly, for example by eating plant roots. These beneficial soil organisms include fungi and bacteria, as well as millipedes, beetles and earthworms. Their main activity is to create humus and minerals that provide sustenance for arable crops. Around 25 percent of all species live in the soil, but only about one percent have been researched. One gram of soil contains up to 8,000 different bacteria genomes. Effective crop rotation – where different crops are grown each year or a field left fallow – can increase biodiversity. By contrast, excessive use of pesticides can severely disrupt the ecosystem. These decisions therefore have a corresponding effect on the long-term yields achieved in food production.

in 2017, a popular initiative with 1.1 million signatures called for a ban based on the findings of a report published by the International Agency for Research on Cancer (IARC), which classed the pesticide as “probably carcinogenic”. However, the competent German body, the Federal Institute for Risk Assessment (BfR), concluded that glyphosate in foodstuffs does not cause cancer and decided to renew the approval. Recent judgements by US courts, however, have ruled that working with glyphosate without adequate protection can cause cancer. As a result, Monsanto (now part of the Bayer Group) was ordered to pay a janitor 289 million dollars in compensation in August 2018. This amount was reduced to 20.5 million dollars on appeal. In June 2020, Bayer tried to agree a settlement with around 125,000 plaintiffs totalling over 10.9 billion US dollars, roughly equivalent to the entire group profits for 2017 to 2019. The court rejected the settlement and legal proceedings are ongoing.

More and more pesticide approvals withdrawn

National authorities are responsible for approving crop protection agents. In describing its approval procedure, the EU states: “The risk assessment for active substances verifies whether, when applied correctly, they potentially have any direct or indirect harmful effect on the health of people or animals”.

To date, however, no research has been conducted into the interactions between pesticides and their possible consequences. EU approvals for pesticides have to be renewed every ten years. As new scientific findings emerge, it is not uncommon for approval to be withdrawn for pesticides in current use. Over the period 1996 to 2006, for example, the US Environmental Protection Agency (EPA) rejected or refused to renew approval for over 270 pesticides. The renewals are often highly controversial.

Glyphosate – the never-ending dispute

Monsanto first launched the weedkiller glyphosate on the market in the seventies, under the brand name Roundup. As a non-selective pesticide, it kills any plant it comes into contact with. The only exception is crops that have been specially bred or genetically modified to be resistant to glyphosate. When EU approval was renewed

Approval procedure for crop protection agents, taking Germany as an example

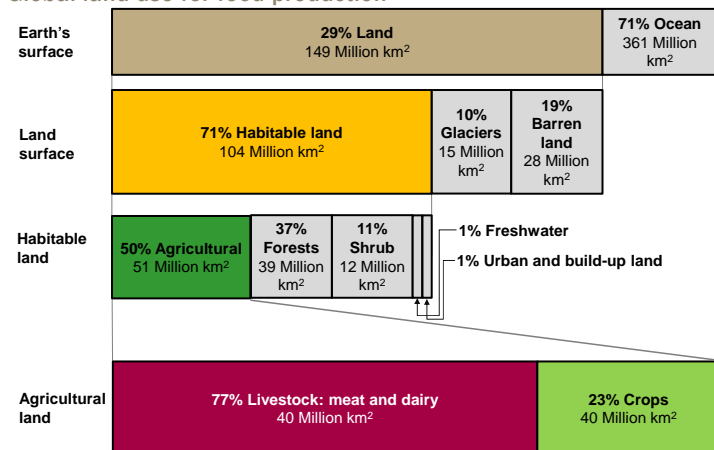


Source: German Federal Ministry for Food and Agriculture, 28.08.2019

Pesticides only marginally improve yields

Today around half the planet's habitable surface area is used for food production. Expanding this area even further would most probably lead to the destruction of forests and exacerbate the problems of climate change and loss of biodiversity. The Swiss agricultural research institute Agroscope cites a summary report estimating that a complete switch to organic farming would reduce crop yields by some 15 percent. The estimates from the reviewed studies for the yield reductions in different types of cereal crops ranged from minus 2 percent to minus 30 percent. It may be possible to redress these losses over time once there is more know-how and research into organic farming. Nevertheless, the bulk of research funding still goes into traditional farming methods. Private companies currently invest more money than governments in agricultural research. Around two thirds of this goes into the development of new plants and pesticides, where the dominant players are the agrochemical giants Bayer, DuPont and Syngenta. The question is whether the negative impacts on human health and the ecosystem cancel out the economic benefits of the higher yields provided by crop protection agents.

Global land use for food production



Source: Our World in Data, 05.05.2021

Farming is more labour intensive without pesticides

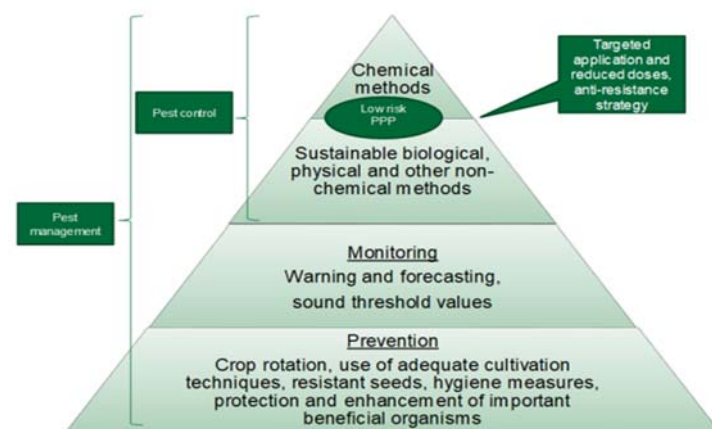
Nowadays experts are advocating integrated pest control, an approach where biological alternatives ("biocides") are often combined with technical measures to reduce negative impacts. Agroscope is currently researching and testing forecasting and warning systems for pest infestation. Organic farmers are already using various pest management technologies as well, such as crop rotation or intercropping. Correct irrigation techniques can reduce fungal infection. However, most of these measures require technical knowledge of the interactions between different plants or more intensive use of machinery or human labour.

Prevention is better than cure – Sustainable farming methods

Pest control is possible even without widespread use of pesticides. Integrated pest control places greater emphasis on prevention in order to reduce the use of synthetic pesticides or to eliminate them entirely, as happens in organic farming. Innovative concepts, frequently inspired by nature itself, include intercropping, agroforestry and permaculture. With intercropping, plants with complementary attributes are grown in the same field in order to prevent infestation by the pests and diseases that tend to affect monocultures. Agroforestry, meanwhile, is typically deployed in tropical zones and integrates fruit trees or palms grown in fields with arable crops to prevent soil erosion and stabilise water resources. The main purpose of permaculture is to replace energy-intensive and environmentally

polluting industrial technologies. The common thread in all these approaches is to avoid the use of toxic chemicals through natural pest control methods. Only a few studies provide evidence of how these technologies affect crop yields. Although the findings indicate only a minimal dip in yields, they are still subject to a high degree of uncertainty.

Principles of integrated pest control



Source: European Court of Auditors, 30.05.2020

Changing regulations and consumer habits present both risks and rewards for investment portfolios

Investors may be exposed to both risks and opportunities due to a sudden change in societal consensus coupled with stricter regulations at the political level, or if companies adopt new and more sustainable solutions. Last year, for example, the EU set a target of a 50 percent reduction in pesticide use by 2030. In Switzerland, two referendums are due to be held on the improvement of water quality and the banning of pesticides. These decisions threaten the revenues of big producers such as Bayer or DuPont. Even without a complete ban, however, profits could come under pressure as stricter regulation necessitates higher spending on research and development for new products and compliance purposes. At the same time, however, the ongoing shift to organic farming methods is producing winners as well, as it provides a tailwind for producers of biocides or innovative farming machinery. The use of novel technologies to monitor and predict pests will increase, and this can be incorporated as a theme in the investment portfolio.

Integration into the investment process

Sustainability specialists at Bank J. Safra Sarasin have been integrating these factors into their investment process for some time now. Risk assessment is performed with the help of the J. Safra Sarasin Matrix®. This combines a best-of-class (industries) with a best-in-class (companies) approach and rates the ESG risks of sectors and individual companies. As part of the biodiversity assessment, the impacts of pesticides are incorporated in the industry analysis via the aggregated ESG industry risk, the aggregated ESG controversy risk and the industry's contribution to the Sustainable Development Goals (SDGs). On the company level, we concentrate on the financially relevant ESG risks. Our analysis takes into consideration the following key themes with a direct or indirect link to the use of pesticides.

- Biological diversity and land use (relevant for 19 industries)
- Toxic substances and waste (relevant for 35 industries)
- Water scarcity (relevant for 30 industries)
- Financing of activities with environmental impacts (relevant for 8 industries)

Finance for Biodiversity Pledge



Source: Bank J. Safra Sarasin, 30.09.2020

At the same time, several firms are already explicitly addressing the issue of pesticides:

- Carrefour is committed to supporting the switch to organic food production through multi-year fixed supply contracts.
- General Mills has set itself goals for sourcing produce grown using organic farming and/or integrated pest control methods.

When rating individual companies, continuous monitoring of global media ensures emerging or escalating controversies are taken into consideration. Companies repeatedly accused in the media or other public reports of environmental pollution, for example, have their scores for the theme of ecology marked down to reflect the negative consequences of the incident. The example of Bayer and glyphosate (see box) demonstrates this risk minimisation approach. On the one hand the company's management of toxic substances is assessed, while on the other hand legal proceedings are taken into consideration in the assessment of controversies. Because of the high risks, the company has already been excluded from the bank's sustainable investment universe for some years.

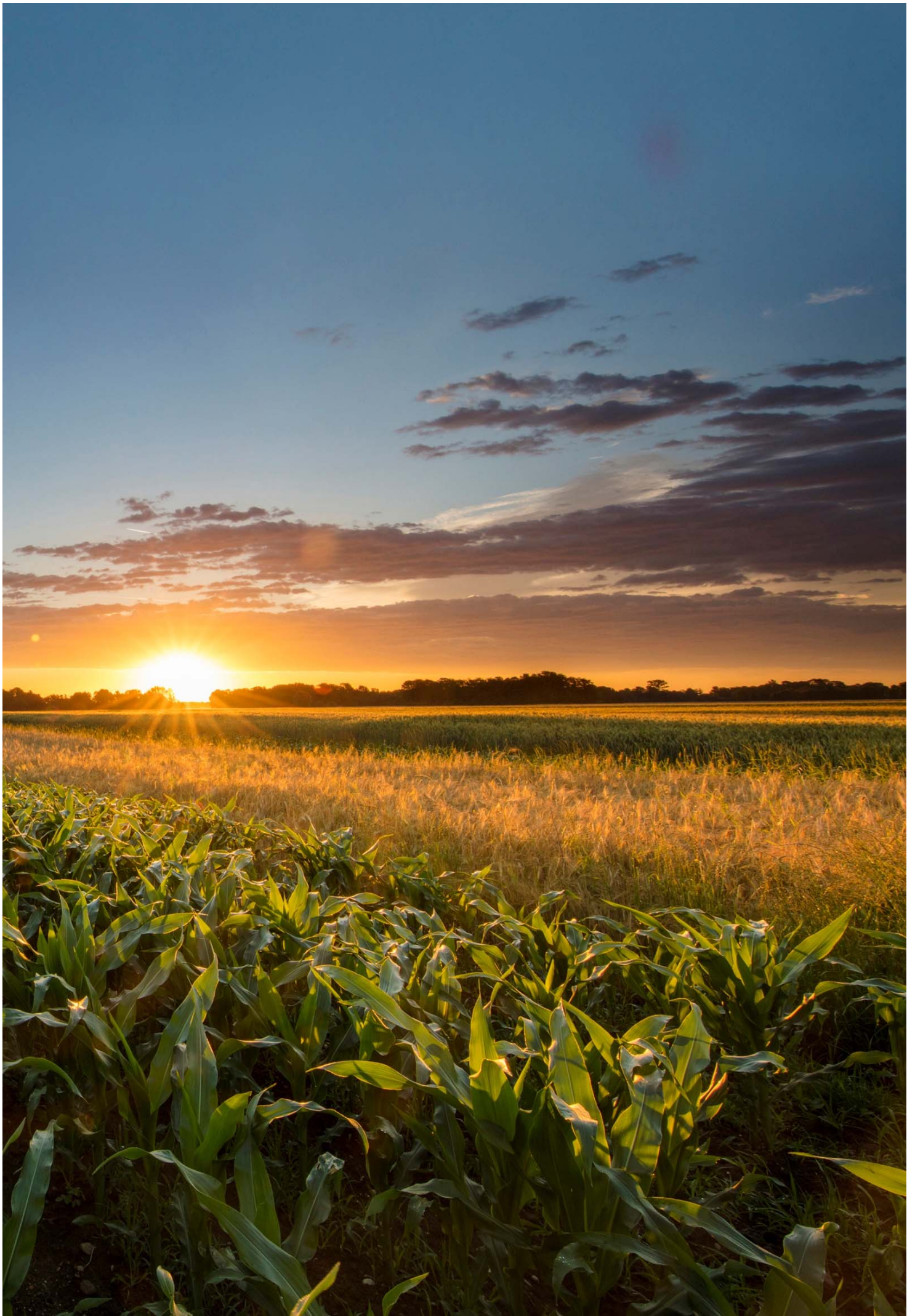
At the same time, we are also on the look-out for investment opportunities. When analysing investments, we focus on companies offering solutions for long-term and transformative trends. These include changing agriculture through reduced pesticide use. Kubota is a manufacturer of agricultural machinery for "precision farming", where soil variations are accurately mapped to ensure more effectively targeted distribution of seeds and fertilisers, as well as the reduction or elimination of pesticides. In recent years this has helped Kubota drive up its sales. Another example is Trimble, a producer of software for spatial positioning which is used for soil mapping. When analysing companies we also refer – as with the SDGs – explicitly to data points such as the proportion of "green" revenues, investments in R&D, and patents linked to environmental criteria. In addition, we identify companies who understand and master the balancing act of generating profits, maintaining competitiveness and minimising environmental impacts.

Pesticides harm biodiversity

The loss of species through the use of pesticides destroys biodiversity. The World Economic Forum views the negative consequences as one of the main global risks for society. The destruction of biodiversity can have significant direct effects on human health if the benefits provided by the ecosystem are not enough to meet the demands of society. It can also have indirect impacts on livelihoods, incomes and local migration, and can occasionally even cause or exacerbate political conflicts. The modest increase in agricultural yield does not justify the excessive use of pesticides. For this reason, Bank J. Safra Sarasin has been the first Swiss bank to sign up to the Pledge for Biodiversity. Integrating biodiversity into the investment process ensures that the material risks of diminishing biological diversity are recognised and minimised for investors.

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Sustainability Rating Methodology

The environmental, social and governance (ESG) analysis of companies is based on a proprietary assessment methodology developed by the Sustainable Investment Research Department of BJSS. All ratings are conducted by in-house sustainability analysts. The sustainability rating incorporates two dimensions which are combined in the Sarasin Sustainability-Matrix®:

Sector Rating: Comparative assessment of industries based upon their impacts on environment and society.

Company Rating: Comparative assessment of companies within their industry based upon their performance to manage their environmental, social and governance risks and opportunities.

Investment Universe: Only companies with a sufficiently high Company Rating (shaded area) qualify for Bank J. Safra Sarasin sustainability funds.

Key issues

When doing a sustainability rating, the analysts in the Sustainable Investment Research Department assess how well companies manage their main stakeholders’ expectations (e.g. employees, suppliers, customers) and how well they manage related general and industry-specific environmental, social and governance risks and opportunities. The company’s management quality with respect to ESG risks and opportunities is compared with its industry peers.

Controversial activities (exclusions)

Certain business activities which are not deemed to be compatible with sustainable development (e.g. armaments, nuclear power, tobacco, pornography) can lead to the exclusion of companies from the Bank J. Safra Sarasin sustainable investment universe.

Data sources

The Sustainable Investment Research Department uses a variety of data sources which are publicly available (e.g. company reports, press, internet search) and data/information provided by service providers which are collecting financial, environmental, social, governance and reputational risk data on behalf of the Sustainable Investment Research Department.

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