



WWF CASE STUDY ASSESSING WATER RISKS OF COMMODITIES



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EXECUTIVE SUMMARY

MANY COMPANIES RELY ON COMMODITIES, DEFINED HERE AS UNPROCESSED MATERIALS OF NATURAL ORIGIN SUCH AS METALS OR AGRICULTURAL PRODUCTS, TO MANUFACTURE THE PRODUCTS AND SERVICES THAT THEY SELL AND THEY SHOULD ASSESS THEIR KEY COMMODITIES' WATER RISKS.

Large global brands typically have large and complex supply chains, which often contribute towards a situation where the company has limited specific visibility of the raw materials within their manufacturing processes as well as the physical location where they are sourced. Often the most significant reliance on water across the supply chain rests within the raw materials along with the associated impacts and dependencies on biodiversity and risks associated with climate change. These risks are amplified when the global supply of a specific commodity used to produce a strategically relevant raw material is limited to a specific region, as one major event within the area could severely limit global supply. As such, building a deeper awareness of the water risks associated with strategic commodities is a critical component of a robust approach to water stewardship practices.

This case study illustrates how WWF worked with global pharmaceutical company AstraZeneca to help it understand the water-related risks, using the **WWF Water Risk Filter**, linked to some of its strategically important commodities – namely palladium and palm oil. The key lessons from this review were:

- It is critical to apply a multi-dimensional approach to identifying and prioritising strategic raw materials that need to be assessed.
- 2. Some degree of water risk assessments can still be completed for raw materials even if a company is still working to map the sources of commodities deep within its supply chain.
- 3. Insights from raw material water risk assessments can inform responses within water stewardship strategies.
- 4. Undertaking a raw material water risk assessment can help to facilitate internal conversations and build awareness across the business around the risks associated with raw materials and water.



INTRODUCTION

COMMODITIES (OR THE UNPROCESSED MATERIALS OF NATURAL ORIGIN SUCH AS METALS or Agricultural products) are the foundations on which almost every business relies – Independent of where they may sit within a supply chain.

The dependence on raw materials is thus unique to every business and is dictated largely by the product and/or service they offer. Despite the criticality of these commodities, companies often lack detailed and comprehensive visibility as to where these raw materials are sourced - especially the further up the company sits within a supply chain (i.e., further away from the source). This is mainly driven by the complexities involved in identifying these networks of suppliers and sources of various raw materials, especially those that may be either synthetically or naturally derived, and collecting reliable data along these supply chains. The complexity increases further when the raw materials that a company purchases span multiple

geographies and supply chain tiers¹. For example, in the pharmaceutical sector, cellulose is used as a bio-based material in biomedical applications linked to various healthcare applications across the sector, including tissue engineering, wound healing and drug delivery². However, cellulose is one of the most abundant bio-based materials, which can be be derived from many sources. This makes identifying the specific source of cellulose potentially highly complex due to its abundant sources of supply.

Mapping the physical location where raw materials are sourced from is essential to fully understand business continuity and resilience risks.



The criticality of these risks is amplified when the commodities involved are highly specialised and are only produced either by a small selection of suppliers or production is geographically confined. For many companies, the risks associated with these commodities could represent material corporate risks that have the potential to erode shareholder value. Furthermore, limited visibility of the sources of commodities can result in reputational risks, as there may be unknown impacts on nature such as pollution or excessive water withdrawals in a scarce region within a company's supply chain. There is a growing trend, and expectation, that companies need to better understand both the impacts they have on the environment (alongside social and economic impacts) across their entire supply chain and the risks embedded within them.3&4

In some cases, commodities can be "global" meaning they are produced by either many suppliers or across multiple geographic locations (e.g., timber products, sugar etc.). In these instances, these commodities are often traded on global raw material markets, which compound the complexities in identifying the original source of the raw material being used by a company within its supply chain. While this may appear to "distribute" the risk profile, the criticality of the raw material again is unique to each company and could still present a risk.

Companies are increasingly shifting their focus to better understand the impacts and risks associated with the tiers deeper within their supply chains². There are many potential social, economic and environmental risks associated with raw materials, but this case study is written to showcase how a company can begin to consider how to prioritise and screen its key raw materials for water related (physical, regulatory and reputational) risks in order to make more informed and strategic risk mitigation decisions. COMPANIES ARE INCREASINGLY SHIFTING THEIR FOCUS TO BETTER UNDERSTAND THE IMPACTS AND RISKS ASSOCIATED WITH THE TIERS DEEPER WITHIN THEIR SUPPLY CHAINS

ASSESSING WATER RISKS OF COMMODITIES AND RAW MATERIALS

A COMMODITY WATER RISK ASSESSMENT IS LIKE A TYPICAL BASIN WATER RISK ASSESSMENT – IT DRAWS ON PROCUREMENT AND SOURCING LOCATION DATA FOR PRIORITY COMMODITIES AND RETURNS INSIGHTS ON ITS ASSOCIATED POTENTIAL PHYSICAL, REPUTATION AND REGULATORY WATER RISKS.

When completing a raw material water

WWF works with partners to gather as

much granular information relating to

the sourcing of the raw material from

granular the information provided (i.e.

meaningful compared to country-level

and specific the results will be from the

generic information is available, WWF often

recommends that we still seek to complete

a risk assessment, but the partner begins

granular information over time to better

to explore how they could access more

improve the screening at a later date.

assessment. In cases where only more

sourcing volumes) the more accurate

risk assessment, WWF works with its

Companies with granular locationspecific data on where they source their raw materials can directly use the freely available WWF Water Risk Filter tool to assess their water risks. However, as a majority of companies often do not have detailed sourcing location data available, WWF has developed an approach leveraging the best publicly available global datasets of raw material production in combination with the tool's water risk data layers. With the increase in demand from partners to better understand their raw material-related water risks but a lack of available location specific sourcing data, WWF is exploring future tool developments to enable online assessments that draw on the best publicly available global datasets of raw material production.

Completing a commodity risk assessment first involves prioritising the key raw materials on which a company relies. Prioritisation of raw materials can take many forms and will be unique to each company but at its core the prioritisation exercise should consider things like:

- · Criticality of a raw material to the final product/service (i.e., without it, would product/service exist?)
- · Criticality of commodity to production of the raw material (i.e., can it be substituted with a synthetic alternative?)
- Availability of raw material (i.e., is it highly specialised or "global" in nature?)
- Sourcing volumes of the raw material (i.e., does the company source large volumes of the raw material?)
- Sourcing volumes of a specific raw materials (i.e., does a supplier require large volumes to produce the raw material?)
- Cost of raw materials (i.e., does the raw material represent a significant cost to the business?)
- Perception of raw material (i.e., are there existing negative public perceptions linked to it?)





APPLYING RAW MATERIAL RISK ASSESSMENT INSIGHTS

ASTRAZENECA IS A GLOBAL, SCIENCE-LED, PATIENT-FOCUSED PHARMACEUTICAL COMPANY. WITH A VAST AND COMPLEX GLOBAL SUPPLY CHAIN THAT INCLUDES A BROAD RANGE OF CHEMICALS AND OTHER RAW MATERIALS WITH MANY TIERS, IDENTIFYING AND MAPPING RAW MATERIALS OF NATURAL ORIGIN CAN BE QUITE CHALLENGING.

A mature Life Cycle Assessment (LCA) programme in line with ISO standards 14040 and 14044 underpins the approach to identifying water risks within our supply chain, providing insights into the type and magnitude of environmental impacts across product supply chains, aligning with the Conservation Hierarchy to first avoid and reduce these impacts where possible. The data underpinning LCAs also provides insight into the dependencies on water in key raw materials by using indicators such as water intensity. However, in order to fully characterise these risks, there is a need for access to much more data that is not easily accessible, requiring significant resource to map back to the initial source, supported by strong partnerships with suppliers across the supply chain.

By collaborating within industry groups like the Pharmaceutical Supply Chain Initiative (PSCI), AstraZeneca has started to identify high risk raw materials of natural origin that are widely used within the industry. In 2021, a commitment was made to have action plans in place for 12 materials by 2025⁵ with identified social and environmental impacts and risks to mitigate against. While progressing with these materials, efforts are underway to build a risk-based approach to assess additional impacts and dependencies on nature more broadly across the supply chain. Although the volumes used by Astra-Zeneca are minimal in the context of the global market, palm oil is one of the materials AstraZeneca initially focused on due to the identified risks of deforestation and social impacts. Certifications such as the Roundtable on Sustainable Palm Oil (RSPO) are being used to provide assurance that the palm oil used within raw materials is sustainable, for example the magnesium stearate supply needed for multiple AstraZeneca products requires steric acid, which is made with a palm oil derivative.

Deeper insights into AstraZeneca's supply chain will enable a more holistic approach to investments decisions. With palladium, for example, a major manufacturing hub located in Sweden has dramatically reduced the volumes of palladium needed by recovering >90% through collaboration with a major supplier. Understanding the risks associated with the raw materials across the supply chain only increases the business case for similar projects and partnerships to increase efficiency and reduce our dependence on natural resources. It also enables commitments to invest in nature restoration, including AZ Forest, AstraZeneca's global initiative to plant and maintain 50 million trees worldwide by the end of 2025, to serve as nature-based solutions to mitigate the identified risks.

CASE STUDY

PALLADIUM WATER RISK

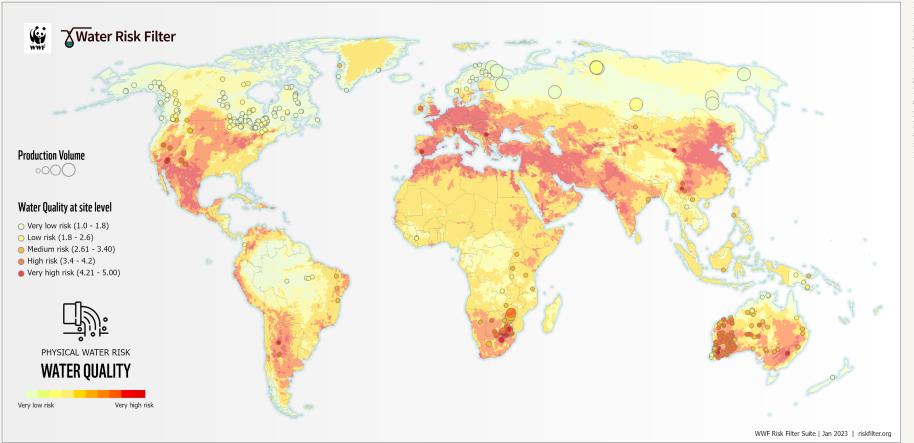


Figure 1: Distribution of 491 palladium mining sites and their associated water quality risks. Location of palladium mining sites is based on S&P Global Metal and Mining dataset. The size of the site marker presents relative site production volume against global total and is based on S&P Global Metal and Mining⁶.

Palladium is a common, but critical catalyst used during the manufacturing of medicines – without palladium chemical reactions needed to create organic molecules are not possible. However, only very small quantities are needed. In 2021, only 200 metric tons of palladium was produced globally – with 40% of total production coming from South Africa. Palladium's important role in chemical reactions and its geographic and volumetric production restrictions make it a priority commodity for AstraZeneca. AstraZeneca procures palladium from an intermediary, which sources it from the global markets – meaning traceability of volumes back to specific mines or geography is still being understood. For the risk assessment, the S&P Global Metal and Mining dataset was used to extract the locations of palladium mines, resulting in a total of 491 palladium mining sites worldwide assessed using the WWF Water Risk Filter. The results showed that almost half the palladium mines are located in basins with medium to very high levels of water quality and ecosystem service risks and 95% faced a medium, or higher, reputational risk. Country level water risk profiles were also developed. While AstraZeneca is still working to developer a deeper understanding of exactly where its sources of palladium are coming from, it now has better insight into potential water risks linked to this critical raw material.

CASE STUDY

PALM OIL WATER RISK

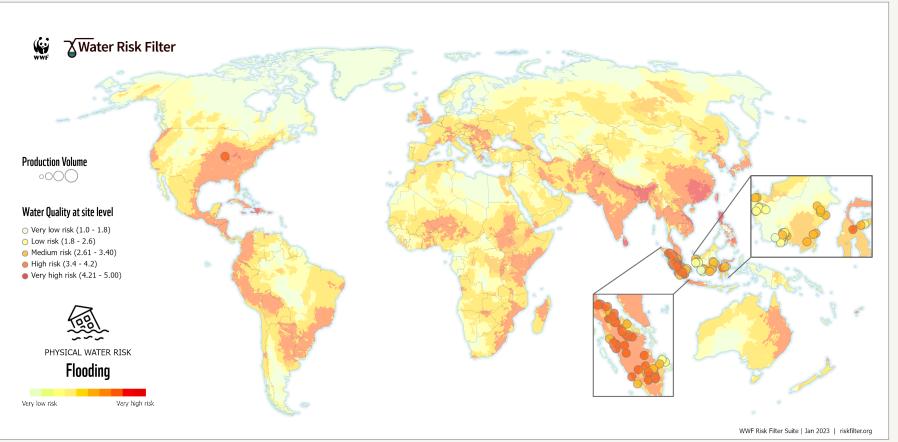


Figure 2: Distribution of identified palm oil production sites in Indonesia and the associated basinscale flooding risks faced by these sites.

AstraZeneca uses magnesium stearate and steric acid in select medications it produces - both of which are derivatives of palm oil. These raw materials are sourced from a major global chemical supplier with 98% of the palm oil used to produce these raw materials coming from Indonesia. The total volume of palm oil needed to create the derivates may be considered to be low relative to other companies who use palm oil but these chemicals are critical to manufacturing of medications – making it one of AstraZeneca's priority raw materials. AstraZeneca has worked with its chemical supplier to identify the sourcing regions of palm oil within Indonesia. Basin-scale flooding and water quality risks were identified as key physical water risks for sites in Indonesia along with reputational risks. The assessment also identified a small selection of sites where projected climate change may make the growing of palm oil in the future more difficult. The results of this assessment helped to demonstrate that most of AstraZeneca's palm oil supply could be traced back to specific regions within Indonesia. They also gave AstraZeneca very specific areas to discuss with its key supplier towards beginning to verify and mitigate identified water related risks.

KEY LESSONS LEARNED

MOST IMPORTANT LESSONS THAT COMPANIES CAN ACCOUNT FOR WHEN Considering completing a similar raw material water risk assessment Within their supply chain are:

1. PURSUE MULTI-DIMENSIONAL

PRIORITISATION OF RAW MATERIALS: In both the cases of palladium and palm oil, the overall volumes of the raw materials that AstraZeneca uses to manufacture its medications are relatively small on a global scale, but they represent critical foundational elements of the manufacturing process with dependencies across the product portfolio.

2. DATA AVAILABILITY DOES NOT LIMIT ASSESSING RISK: In the case of palladium, the lack of specific sourcing information could be reasonably overcome using other sources of data and targeted assumptions. While more granular and specific souring information yields more accurate screening of water risks – limited data constraints can be overcome. However, it is critical for companies to increase efforts in transparency and traceability of their supply chain in order to have a more accurate understanding of water risks across their raw materials. 3. ASSESSMENT OUTPUTS YIELD MORE STRATEGIC RESPONSES:

The outputs of a raw material water risks assessment provide greater insights into potential water risks facing priority raw materials. Performed across a company's supply chain, these can enable companies to create more meaningful investment decisions by prioritising action plans and collaborations with key suppliers towards mitigating these risks.

- 4. BUILDING INTERNAL AWARENESS OF WATER:
 - In preparing for a raw material water risk assessment, a company often needs to enlist the support of multiple internal stakeholders who typically sit outside of the sustainability team. This creates an opportunity for building greater awareness of water within the company but also helps internal stakeholders make a more tangible connection between their work and water.

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