

# Understanding Nature and Biodiversity's Impact on Businesses

Students: Wang Ruitong, Janice Mok Jieli, Pham Tiem Manh, Zou Yancen  
Academic Supervisor: Dr. Carrasco Torrecilla, L Roman



## Project Background & Research Methodology

- Human activities have created a significant impact on the physical environment, including biodiversity loss
- 30% of the global biodiversity loss is driven by land use and 20% is driven by overexploitation of natural resources, including food and timber; part of the biodiversity loss also indirectly driven by global warming
- More profound understanding among the public of the importance of preserving biodiversity and nature rather than only focusing on economic return from human activities (COP 15, TNFD, CDP and other disclosures)

Was it 'actually' financially impaired?

From what other aspects should we assess it?

Takeaways for investors and companies?

Industry Identification

Crisis Pinpointing

Impact Observation

Company Analysis

## Oil & Gas Industry British Petroleum (BP)

**Development Stage:** road development, seismic surveys, hydraulic fracturing

**Operating Stage:** contamination from accidental spills, climate change (indirect)

**Crisis Overview - BP Deep Horizon Oil Spill:** 205.8 million gallons of oil, 22500 tons of methane, and 2 million gallons of dispersants into the Gulf of Mexico (only 25% recouped)

**Biodiversity Aftermaths:** 82000 birds, 6165 sea turtles, and 25900 marine and countless terrestrial mammals either harmed or killed

**Other Aftermaths:** 11 workers killed and 17 injured, >1/3 federal waters closed, \$2.3 billion in the fishing industry output lost



- Over \$65 billion in cleanup expenses, compensations and legal settlements
- Share price plummeted by over 50%
- Initial negative abnormal returns in the first month, stabilize over time and then slowly diminish in the long run
- Initial drop not recovered over time

- Market position dropped from 4th (2010) to 10th (2024) by market cap
- Wide-scale reaction from other industry giants, including Shell, Exxon and Chevron, highlighting the potential catastrophic effect on the entire industry
- Biodiversity aftermaths is expected to last for a much longer time horizon
- Challenging to identify biodiversity impact on share price in the long-run

## Renewable Energy Industry - Hydro China Yangtze Power Corporation (CYPC)

**Development Stage:** massive amount of land cleared for facilities including reservoirs

**Operating Stage:** dams disrupt river flows, release sediments to downstream habitats

**Project Overview - Three Gorges Dam:** largest hydropower facility in the world, with a 22 GW installed capacity, built on the Yangtze River, one of the more biodiverse areas on earth

**Biodiversity Aftermaths:** 90% decline in four species of carp, several aquatic species either completely extinct or close to extinct

**Other Aftermaths:** 1.3 million people relocated, 100000 hectares agricultural lands flooded, 13000 heritage sites demolished



- General upward trend and reached its all-time high in 2024; decrease from 2008 to 2014 due to global financial crisis and China's economic transition
- Announcement of Yangtze River Basin Biodiversity Conservation project (\$51.3 million) did not cause huge loss

- 'Ecological impacts' not considered financially material for the industry (SASB)
- Lack of transparency and sufficient financial data on related project spending
- State-owned enterprises benefit from featuring on their strategic importance and environmental initiatives and minimized exposure on their environmental damages
- CYPC's global presence shows norm of economical need over dams' natural impact

## Agriculture Industry Bayer Monsanto (Bayer)

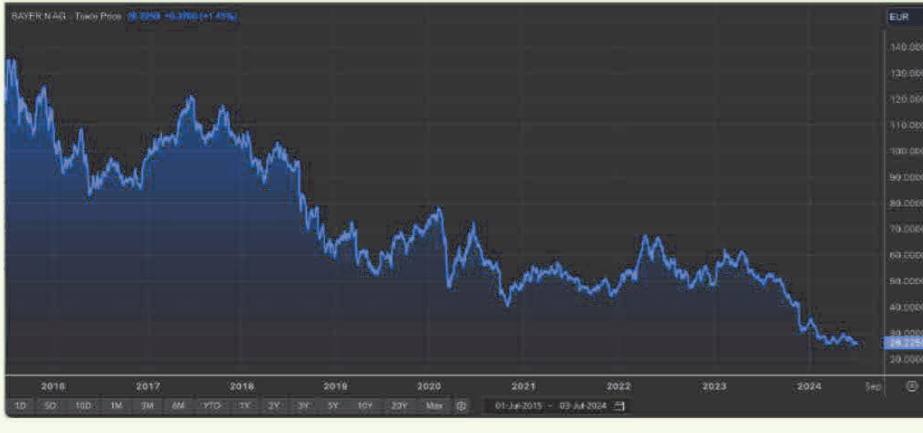
**Development Stage:** land use transformation through intensification of agriculture

**Operating Stage:** contamination from herbicide, altering soil functions and plant health

**Crisis Overview - Bayer Monsanto Litigation:** acquired Monsanto in 2018, known for its glyphosate use; WHO classified it as Group 2A, "Probably carcinogenic to humans", in 2015

**Biodiversity Aftermaths:** in 2012, Monarch Butterfly population in North America was at the lowest level, 20 times < peak in 1997

**Other Aftermaths:** alarming levels of glyphosate found in popular American foods in 2016, led to near 170000 claims by 2024



- Bayer's stock lost 70% of its value since its 2018 acquisition of Monsanto
- In November 2023, Bayer has acknowledged that it continued to be burdened by the glyphosate litigation
- Bayer had its overall 'outlook' lowered to 'negative' from 'stable' by Moody's

- Stock price change is attributed more to legal challenges, rather than biodiversity-related impacts; mergers should only be dealt with extensive due diligence
- Biodiversity is important, but human-related impacts are more 'important', since glyphosate was first introduced in 1974, but it was only until WHO classified it in 2015 then we saw numerous lawsuits being taken against Monsanto (and Bayer)

## Mining Industry Vale S.A. (Vale)

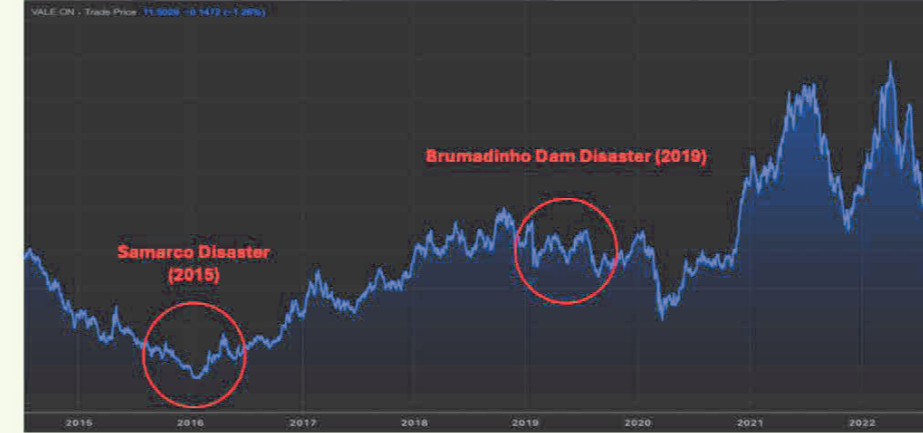
**Development Stage:** land clearing, drilling, and blasting; infrastructures increase access

**Operating Stage:** pollution includes acidic drainage, toxic waste, water contamination

**Crisis Overview - Brumadinho Dam Disaster:** tailings dam collapsed, releasing waste that submerged Vale headquarters, residential areas, and farmland, reaching Paraopeba River

**Biodiversity Aftermaths:** 125 hectares of forests were lost, and extensive water pollution due to sulfuric acid and heavy metals

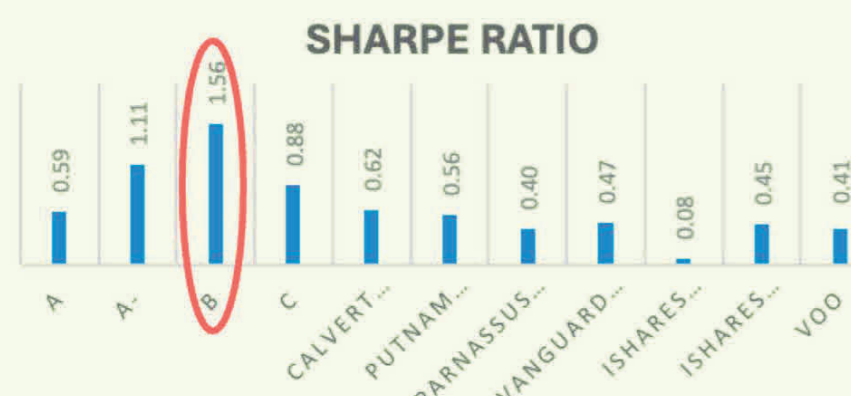
**Other Aftermaths:** over 270 people died; atmospheric dust affecting air quality and respiratory health of nearby communities



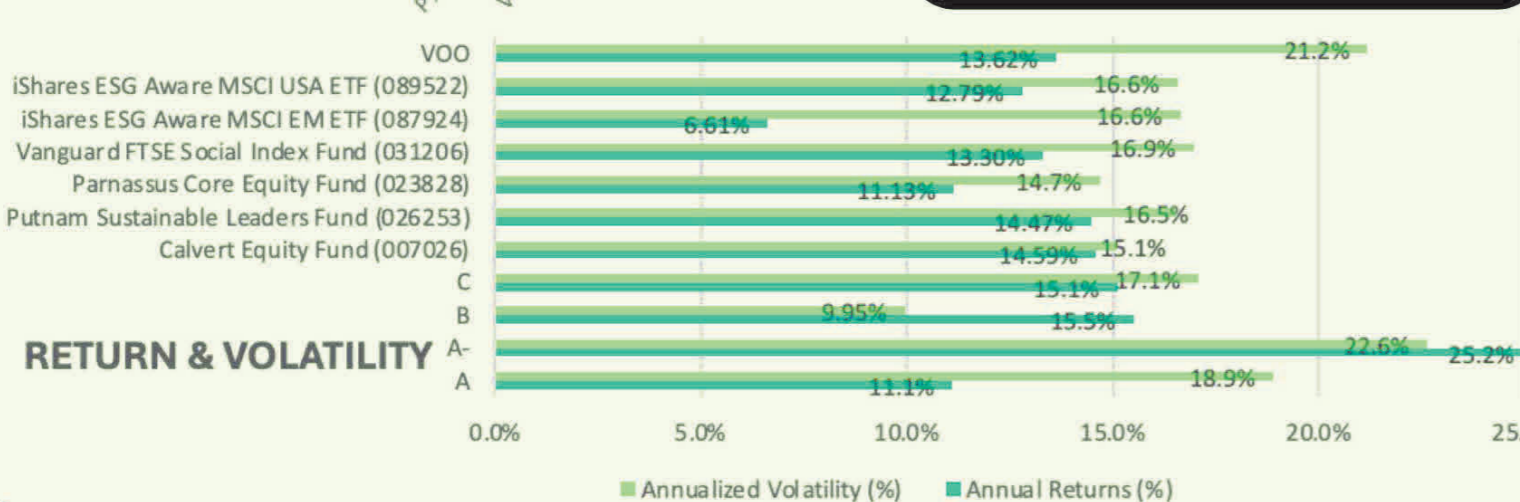
- Over \$4.5 billion in cleanup expenses, compensations and legal settlements
- Market capitalisation fell by \$19 billion within a few days post-disaster
- Key fundamentals and stock price rebounded within one year after this crisis (2019) and another in 2015

- Challenging to isolate the financial impact of biodiversity from human casualties and economic losses and often little or no information on fines utilization
- Mining industry plays a crucial role in global decarbonization; Rio Tinto could still acquire permits to operate despite numerous controversies these years
- Proper risk and opportunity management and industry trend to boost its rebound

## Supplementary Evidence from Quantitative Analysis and Final Takeaways



- Portfolios formed by compiling companies under CDP Forests List A, A-, B and C (active disclosure)
- Without holding other factors constant, B-list excels



- A company's impact on nature is hardly directly related to its financial performance.
- Biodiversity impact is extremely difficult to quantify; However, a company's biodiversity impact can be easily overlooked if such a crisis does not affect human society immediately.
- A company's nature, the characteristics of the industry it belongs to, and the country it is in could affect how much biodiversity-related factors can be priced into its valuation.
- Information asymmetry can be an extremely discerning factor, especially since the impact of biodiversity typically only shows its effect once a threshold is met.
- It is often the case that the biodiversity impact a company has is similar to that of its competitors. Therefore, constantly watching out for their reactions and strategies is essential.
- The impact of biodiversity on the company's financial performance may diminish in the short term, but the damage on the eco-system will persist in a much longer term.
- Negative biodiversity impact has resulted from market, policy and institutional failures, thus it is crucial that economies embark on sustainable development paths.