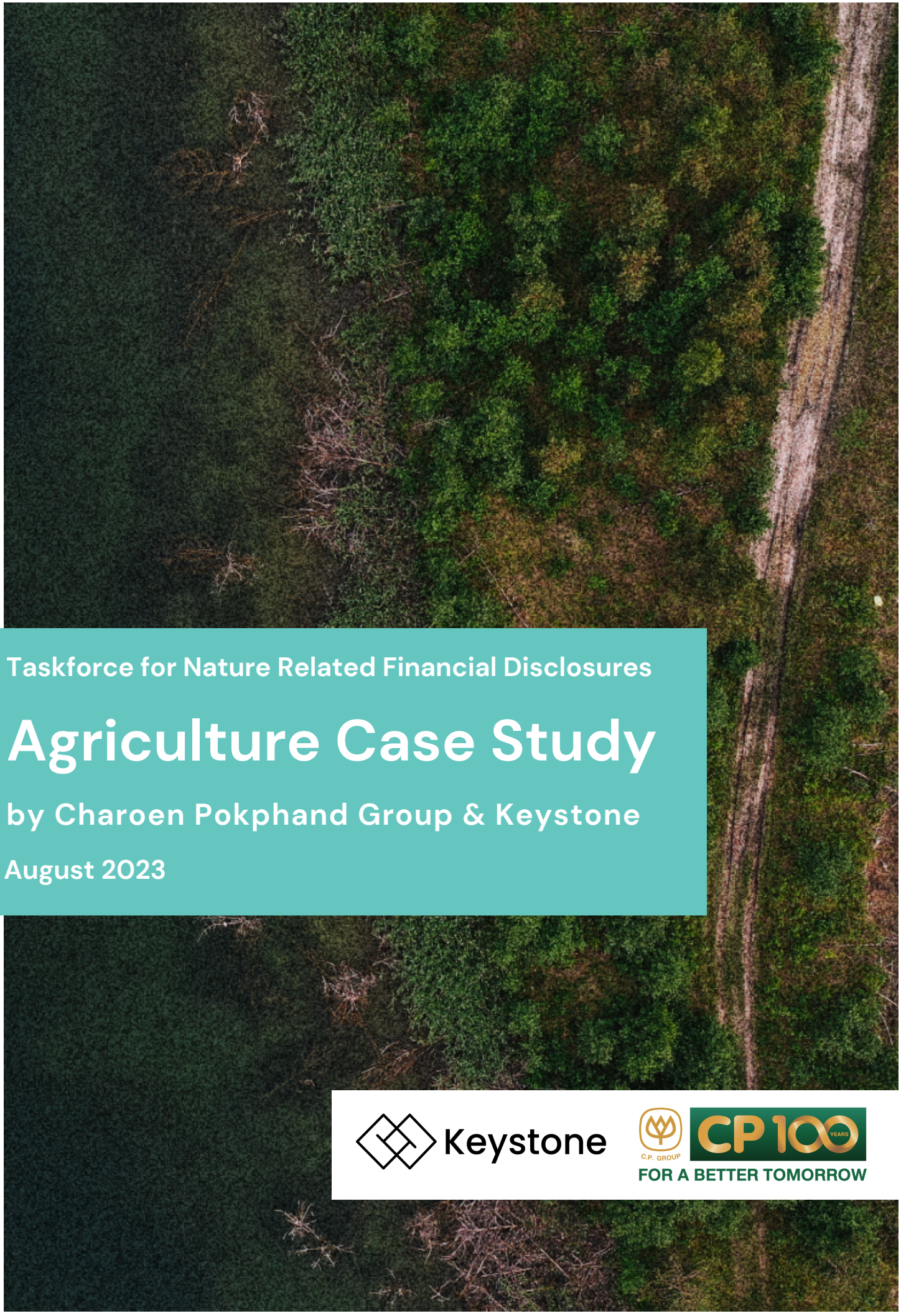

Taskforce for Nature Related Financial Disclosures

Agriculture Case Study

by Charoen Pokphand Group & Keystone

August 2023

Keystone

C.P. GROUP

CP 100 YEARS

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Introduction

This case study illustrates how Charoen Pokphand Group (CPG) piloted the Taskforce for Nature-related Financial Disclosure's (TNFD)'s nature-related risk assessment (known as LEAP) on its agricultural business lines. This pilot was a partnership between CPG, a Thai conglomerate, with Keystone, a biodiversity software provider. Keystone's software integrated external data with CPG's primary business data to conduct the assessment.

This report presents the pilot's assessment results and key insights, focusing on the first two stages of LEAP: Locate and Evaluate, using TNFD Beta v0.4. The action plan details from the last two stages of this pilot, Assess and Prepare, are being aligned with CPG's sustainability strategy and will be shared in more detail in CPG's next annual Sustainability report.

The TNFD LEAP framework is a 4-stage process that helps companies:

1. **Locate** their businesses' biodiversity and nature-related footprint, prioritising high-impact sites for further evaluation;
2. **Evaluate** prioritised sites for nature-related impacts and dependencies;
3. **Assess** the nature-related risks and opportunities; and
4. **Prepare** to respond and report on the identified outcomes.

Figure 1: TNFD LEAP framework adapted from TNFD guidance

1. Locate: Interface with Nature

L1 - Business Footprint

CPG is a Thai conglomerate with 8 business lines, two of which are its agro-industry and food businesses. Its agro-industrial arm produces animal feed, crop seeds, meat, animal products and ready-to-eat foods. CPG is the world's biggest producer of animal feed, shrimp, and the largest producer of pork and poultry in Thailand. CPG has direct operations in 21 countries, and 20,000+ directly owned and upstream supplier sites globally.

Figure 2: Diagram of Charoen Pokphand Group's agro-industry and food business lines.

L4 - Sector Identification

Keystone assessed CPG's 8 industries and their sub-production processes against ENCORE data to target those with greatest potential nature-related impacts and dependencies for the pilot. The top-scoring business lines, animal feed production and livestock farming, were chosen. Both of these business lines belong to CPG's agro-industry, which accounts for the biggest share of CPG's revenue. Given the business size and potential impact on nature, CPG's animal feed and livestock businesses offer substantial potential for change.

Pilot Site Selection

CPG aimed to choose pilot sites within these two business lines that would have high potential impact on nature and validate if the TNFD Locate methodology would indeed rate them as high impact for further assessment. To accomplish this, Keystone assessed agricultural commodities produced by CPG's directly owned and operated farms against the Science Based Targets Network's (SBTN) High Impact Commodities List. Five farms that produced high-impact commodities- rice, corn, soy, poultry and swine, were selected in countries provide a representative sample of CPG's geographic footprint: Thailand, China, Bangladesh and Myanmar.

L2 - Nature Interface

Upon selecting the 5 pilot farms, Keystone delved into understanding each site's interface with nature by identifying the biomes that each site operated in by using each site's geolocation and site boundaries. Output verification involved cross-referencing with ArcGIS, UN Biodiversity Lab, and the IUCN Global Ecosystem Typology. The biomes that each farm operated within were:

1. Thai grain (corn, soy & rice) farm – T1.2 tropical and subtropical dry forests & thickets
2. Bangladeshi poultry farm – TF1.4 seasonal floodplain marshes
3. Myanmar swine farm – T1.1 tropical and subtropical lowland rainforest
4. Chinese swine farm – T4.5 temperate sub-humid grasslands
5. Chinese poultry farm - T2.4 warm temperate laurophyll forests

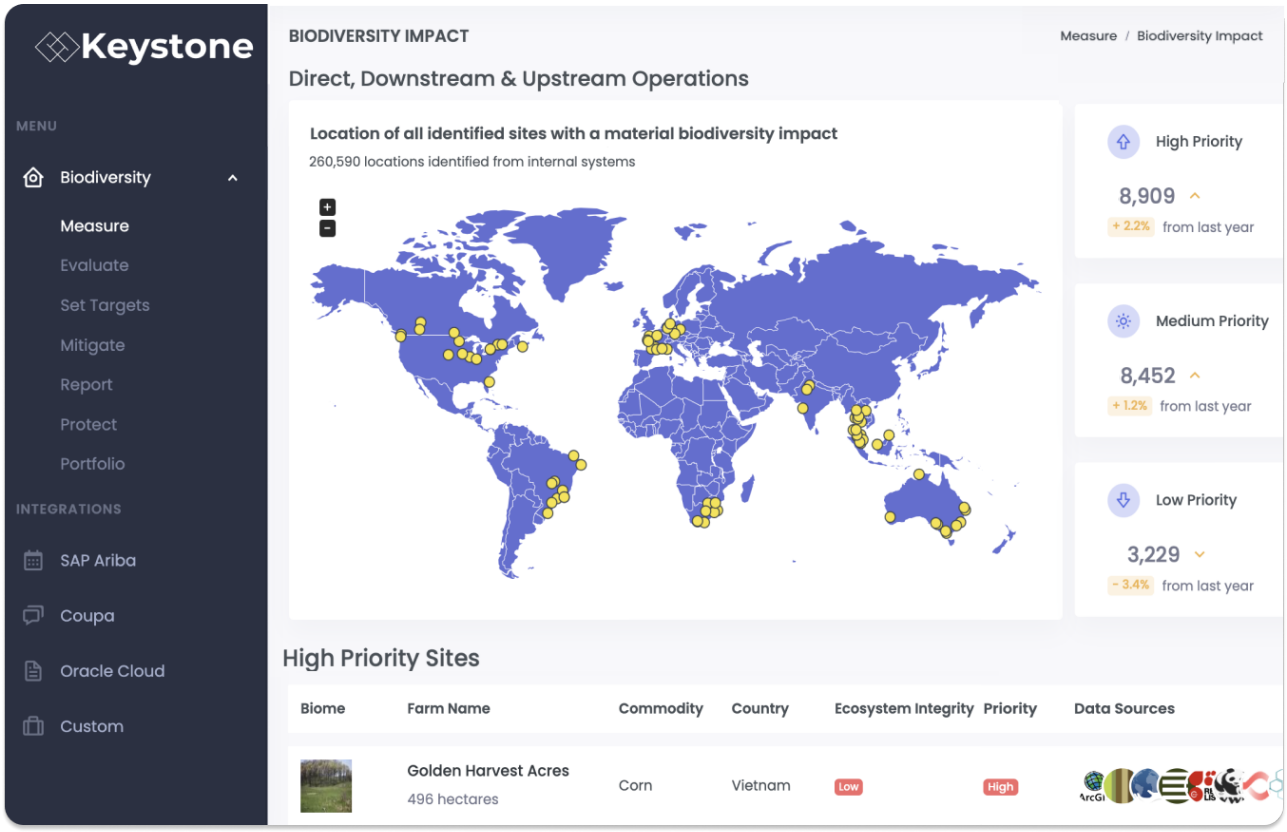

Figure 1: Keystone's software locating and prioritising company sites in the Locate phase.

L3 – Priority Location Identification

Challenges in the Locate Phase

Given the high volume of sites, diversity of business lines and production processes at each site, CPG faced difficulty evaluating all its locations to pinpoint those with the greatest biodiversity and nature-related risks. Prioritisation was vital for efficiently allocating resources to addressing the most significant impacts and opportunities.

Solution: Keystone's software enabled CPG to swiftly and accurately implement the Locate methodology, identifying the top-priority sites.

To determine which pilot sites would score as high priority for subsequent analysis using the Evaluate, Assess and Prepare phases, Keystone applied the 4 scoring criteria with Locate's L3 stage (see Figure 3). A site earned a high-priority rating if it scored high on any of the 4 criteria. This section outlines how each of the four criteria were calculated.

Ecosystem Integrity

The Ecosystem Integrity Index (EII) measures the extent of ecosystem degradation. It encompasses three elements: ecosystem structure, composition, and function. According to the scoring approach of L3, sites exhibiting high levels of ecosystem integrity should be prioritised for conservation efforts, to avoid further degradation. This is because sites with high EII values preserve robust ecosystems, resulting in optimal ecosystem services provision and biodiversity preservation. The EII score for each pilot site was derived using the methodology outlined in Hill et al., 2022. None of the sites met the criterion for high ecosystem integrity (>0.7) on a scale of 0 to 1, where 0 signifies the most degraded ecosystems.

Biodiversity Importance

Biodiversity importance was scored using the 6 criteria specified in the L3 guidance (see Figure 3) and screened against the IUCN, IBAT, Protected Planet and World Heritage lists. The Thai grain farm met the high biodiversity importance criteria due to the potential presence of a high volume of threatened species within a 25km radius of the farm.

However, none of the remaining 5 biodiversity importance criteria were satisfied by any site. These additional criteria encompassed factors such as like proximity to legally protected areas or key biodiversity zones within a 5km radius.

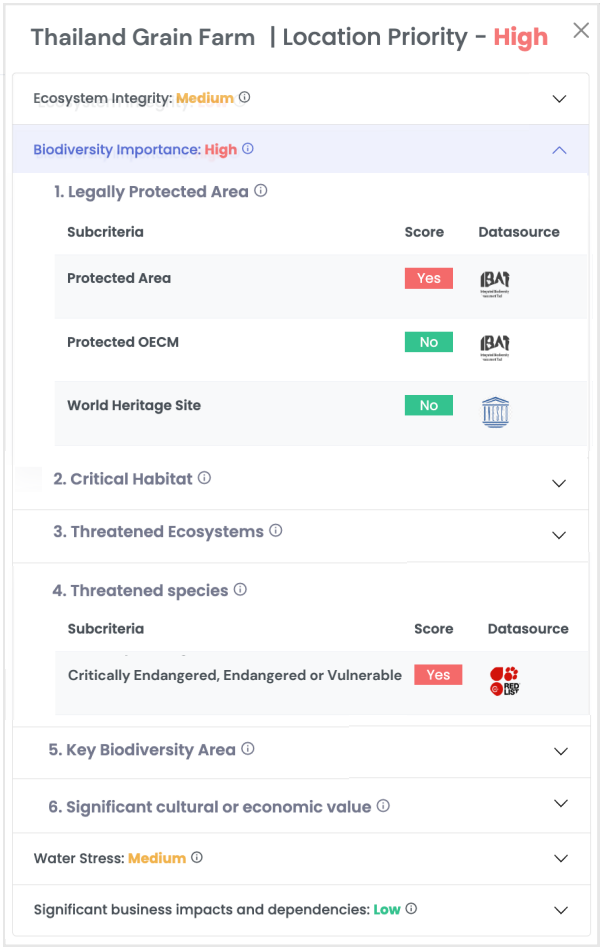

Figure 3: Keystone interface showing how the Thailand grain site scored against TNFD's L3 prioritisation criteria

Water Stress

Each of the five sites has been identified as experiencing high water stress. The TNFD methodology defines a water stressed location as "the location is an area of known water stress, where the quality and/ or quantity of available water is deteriorating." To determine the level of water stress at each site, Keystone screened three public databases for each site's state of water quantity and quality: WWF Water Risk Filter, WRI Aqueduct, and the SBTN State of Nature Water Layers. The three databases were cross-referenced to improve data accuracy.

Significant business impacts and dependencies

All five sites received a high rating for potential business-driven impacts, as a result of farming high impact commodities from the SBTN High Impact Commodity List, in this instance: rice, corn, soy, poultry, and swine. However, CPG had a low dependency rating on all sites. CPG's business dependency on a particular site was considered high when the business:

- sourced a significant, fixed percentage of annual procurement volumes of a specific raw material from this location; or
- generated a significant percentage of annual revenue (fixed percentage) from materials sourced/ production processes operated in this location.

Ultimately, all five farms were classified as high priority due to their locations in areas with significant water stress, even though not all sites met the high priority thresholds for the remaining three criteria: ecosystem integrity, biodiversity importance and business impact and dependence.

2. Evaluate: Impacts & Dependencies

After identifying the prioritised sites for further assessment, Keystone's software aided CPG in assessing the dependencies and impacts associated with these sites in the Evaluate phase.

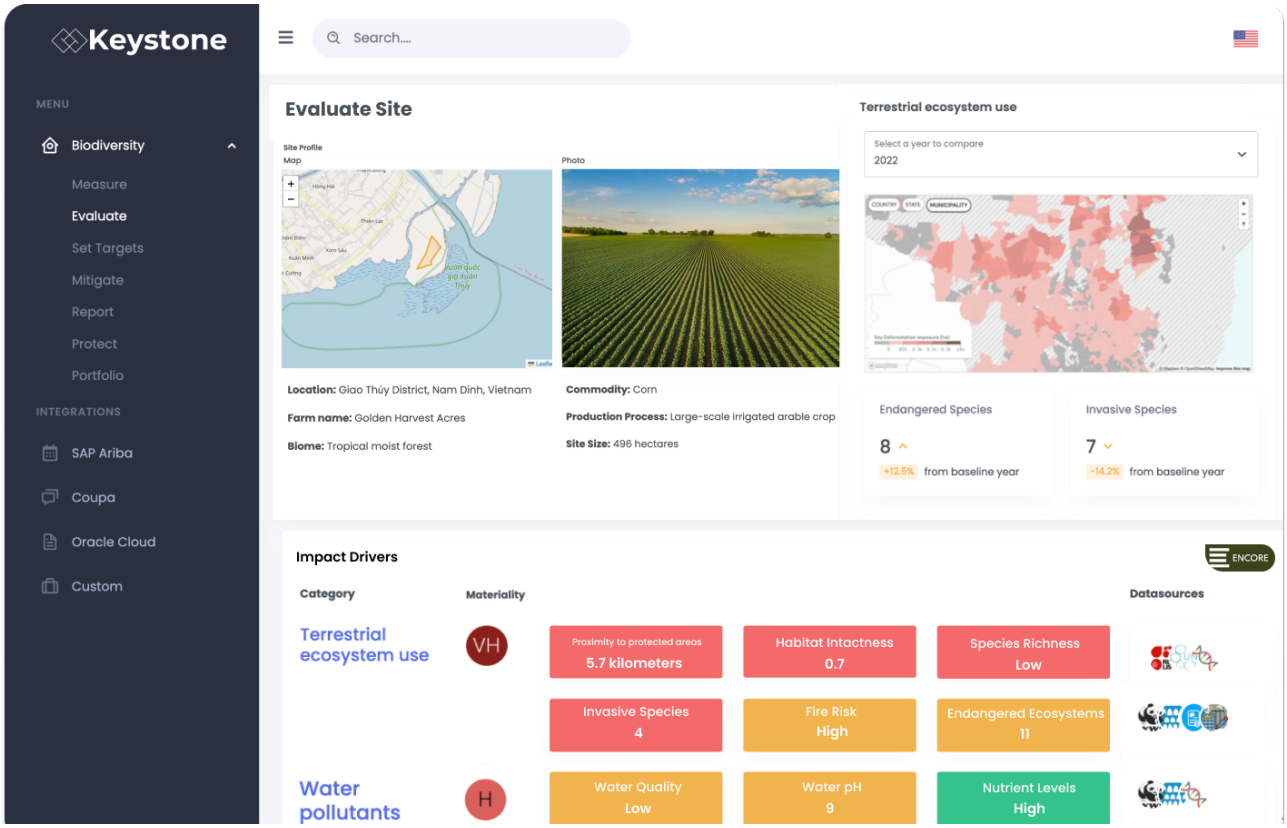

Figure 4: Keystone software interface showing site-by-site analysis during the Evaluate phase.

Challenges in the Evaluate Phase: Assessment Depth

CPG found it challenging to conduct in-depth biodiversity impact and dependency assessments required in the Evaluate phase on its priority sites, without costly and extensive on-the-ground sampling and field surveys.

Solution: With the help of Keystone's software, a comprehensive assessment was achieved for all sites. Key evaluations were conducted using Geographic Information Systems (GIS), along with third-party and proprietary data sources:

- **Deforestation & farm-driven habitat conversion:** Satellite imagery was used to identify any deforestation, the date and extent of any business-driven land conversion from primary or secondary forest.
- **Water use & and stress:** Water source and water basin maps enabled the identification of upstream waterbodies and downstream impact of each farm's water consumption and future stressors.
- **Wastewater and soil pollution:** Satellite imagery and upstream and downstream sub-basin maps identified potential downstream impact of water and soil pollution from wastewater.
- **Threatened species:** The likelihood of occurrence of endangered species on or near each farm was predicted by combining the IUCN Red List of Threatened Species data with each farm's habitat and ecosystem characteristics. This filtered out species whose habitat preferences did not match with the site characteristics, based on IUCN's Global Ecosystem Typology.

E1 – ID of Relevant Environmental Assets and Ecosystem Services

Environmental assets and ecosystem services crucial to poultry, swine and grain farming were identified using the United Nations's System of Environmental-Economic Accounting, guided by ENCORE's materiality ratings. The results were then tailored to each site's ecosystem characteristics. For instance, the Chinese swine farm's sole reliance on groundwater for water supply increased the materiality rating for the subterranean freshwater ecosystem asset. The top 3 ecosystem services and assets for poultry and swine farming is shown in Figure 5.

Ecosystem service	Materiality	Production process relationship	Reason	Environmental Assets
Biomass provisioning	VH	Direct physical input	• Poultry and swine farms require large amounts of animal fodder, primarily corn and soy.	• Land • Cultivated biological resources
Water supply	VH	Direct physical input	• Indoor poultry and swine farms require large amounts of water for livestock watering and premise cleaning.	• Subterranean freshwater ecosystems • Freshwater ecosystems
Soil quality regulation	H	Enables production process	• Animal feed farming, including corn and soy farming, is only possible with healthy soils.	• Atmospheric systems • Land • Subterranean terrestrial ecosystems • Minerals • Water resources

Figure 5: The most critical ecosystem services and environmental assets for CPG's livestock farms.

E2 – ID of Dependencies and Impacts

Summarised in Figure 6 below are the primary material impact drivers identified, along with their associated impact pathways for each site.

Impact Drivers	Materiality	Business Activity	Impact on Nature	Affected Sites
Terrestrial ecosystem use	VH	Agricultural land conversion	• Habitat degradation • Loss of species richness & abundance • Introduction of invasive species • Loss of climate resilience	All sites
Water use	VH	Irrigation & livestock watering	• Freshwater habitat degradation from water diversion • Loss of species richness & abundance • Reduced water supply	Thailand grain farm China swine farm Bangladesh poultry farm Myanmar swine farm
Terrestrial ecosystem use	VH	Rodenticide use	• Loss of species richness & abundance • Soil quality decline	Bangladesh poultry farm Myanmar swine farm
Water & soil pollution	M	Livestock farming wastewater discharge	• Soil & water quality decline • Soil carbon loss • Soil erosion • Reduced nutrient cycling	Bangladesh poultry farm

Figure 6: Top impact drivers and their pathways identified for all 5 pilot sites.

Challenges in E2: Data Availability

Each of CPG's sites had a varying level of primary data availability. Some sites only had the geolocation and water consumption data.

Solution: Keystone's integration with a large number of datasets reduced the data scarcity problem. For instance, certain datasets lacked recent data specific to China, including species richness or water basin maps. By utilising multiple sources for the same indicators, Keystone overcame the problem of data gaps.

E3 & E4 - Impact and Dependency Analysis

Below are examples of how two key biodiversity impacts were identified:

Water withdrawal from potential endangered species habitat

To evaluate the impact of farm water use on biodiversity, Keystone overlaid site boundaries with watershed maps, as well as with water source, supplier, and volumes information from CPG to determine whether the sites' rate of withdrawal would impact water-stressed sources or waterways that should be protected as threatened species habitats.

Through this process, the Bangladesh poultry farm's water source was identified as a pond that is a potential habitat for 7 critically endangered and 21 endangered species. Hence, a proposed action arising from this analysis was a downstream habitat management plan to prevent local extinction of these species in the pond through water depletion.

Habitat conversion

Keystone used satellite imagery to determine the extent of land clearance before and after the construction of each farm. Keystone determined that, out of the five sites assessed, the construction of the Chinese poultry farm converted the largest and most intact area of naturally regenerating forests. The primary forests and secondary warm temperate laurophyl forests of the site were partially converted into farmland in 2017. The next year in 2018, poultry factories were built on the converted farmland. This, in turn, significantly reduced the habitat connectivity of the surrounding naturally regenerating forest.

Challenges in E3 & E4 - Finding Suitable Methodologies

CPG found it challenging to apply commodity-specific biodiversity assessments at scale. The production processes for each commodity, be it grain, poultry, or swine, have different impacts on nature, requiring different assessment methods. For example, the eutrophication potential of swine manure is much greater than that of poultry farms.

Solution: Keystone's pre-programmed set of commodity and production process-specific methodologies, metrics and datasets helped CPG quickly replicate the assessment across sites with similar operations. Keystone adapted the livestock assessment methodology and indicator metrics suggested in the TNFD Food and Agriculture Additional Sector Guidance and the United Nations Food and Agriculture Organization's Biodiversity Guidance into its systems.

3. Assess Risks & Opportunities

A1 – A4: Existing & Additional Risks and Opportunities Assessment

Keystone developed risk mitigation strategies and identified opportunities for CPG in response to the most significant biodiversity impact drivers identified during the Evaluate phase, summarised in Figure 6 below.

Nature-related risk	Materiality	Mitigation opportunity	Applicable sites
Habitat conversion	Very high	Restore 30% of degraded habitat on this farm by implementing habitat conservation and restoration methods.	China poultry farm
High water use	Very high	Conserve and reduce water use in line with CPG's water reduction target, focusing on sites with high water stress and dependency.	All sites
Pesticide poisoning	Very high	Implement integrated pest management controls for rodents on these 2 farms.	Bangladesh poultry farm Myanmar swine farm
Wastewater pollution	Medium	Treat wastewater via bioremediation on this farm.	Bangladesh poultry farm

Figure 6: Proposed mitigation opportunities to the nature-related risks identified at the 5 pilot sites.

4. Prepare to Respond & Report

P1 & P2: Strategy & Performance Measurement

Each action identified in the Assess phase was matched with the relevant targets from the Kunming-Montreal Global Biodiversity Framework and CPG's current biodiversity targets. This alignment helps CPG track progress and determine performance metrics. A summary of these targets is shown in Figure 7 below.

Nature-related risk	Applicable Global Biodiversity Framework Target	Proposed Organization-wide Target
Habitat conversion	Target 2: Restore 30% of degraded nature	Restore 30% of degraded nature by 2030 on all high priority sites.
High water use	Target 11: restore, maintain and enhance freshwater ecosystem functions	Adopt a policy of non-chemical pest control management on all directly owned and operated farms across CPG's portfolio where possible. Reduce pesticide risk by 50%.
Pesticide poisoning	Target 7: Reduce pollution to levels that are not harmful to biodiversity and reduce pesticide risk by 50%	Treat effluent to meet the local and national standard before discharge into nature.
Wastewater pollution	Target 7: Reduce pollution to levels that are not harmful to biodiversity and reduce loss of excess nutrients by 50%	20% reduction in water withdrawal per unit revenue compared to baseline year 2020.

Figure 7: Proposed organization-wide targets aligned to the Global Biodiversity Framework.

P3 & P4: Reporting & Presentation

CPG will incorporate the insights and actions from the pilot progressively across the organisation and report on its progress in its next annual sustainability report.

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