



มูลนิธิแม่ฟ้าหลวง ในพระบรมราชูปถัมภ์
Mae Fah Luang Foundation under Royal Patronage



TASKFORCE ON NATURE-RELATED FINANCIAL DISCLOSURES REPORT

Fiscal Year 2024

Table of Contents

Introduction _____ 1

Governance _____ 6

Strategy _____ 7

Risk and Impact Management _____ 16

Metrics and Targets _____ 18

1

INTRODUCTION

The Mae Fah Luang Foundation (MFLF) is a leading community development agency with over 35 years of experiences, dedicated to improve the livelihoods of marginalized communities and restoring nature. Initially focused on supporting ethnic minority groups in Northern Thailand, the Foundation's people-centered approach empowers underprivileged individuals by fostering economic, social, and environmental well-being. A core principle of the MFLF is the belief that communities can thrive in harmony with nature. Since 1988, the Foundation has pioneered sustainable development projects, with the Doi Tung Development Project (DTDP) serving as its flagship initiative. Over time, the MFLF has expanded and covered initiatives including Doi Tung Social Enterprises, community projects across Thailand, and outreach initiatives beyond its borders.

The MFLF has long upheld the principle of integrating economic development with a balanced focus on social well-being and environmental resilience — a philosophy that aligns with the evolving global landscape. Today, the Foundation operates through four strategic pillars:

- Area-based Development
- DoiTung Social Enterprise
- Nature-based Solutions
- Sustainability Advisory



— AREA-BASED DEVELOPMENT



— DOITUNG SOCIAL ENTERPRISE



— NATURE-BASED SOLUTIONS



— SUSTAINABILITY ADVISORY

The Foundation acknowledges the critical role nature plays in planetary health and the long-term sustainability of its work. In response to growing environmental challenges, the MFLF is committed to proactive nature stewardship, ensuring the resilience of the Foundation's projects and the ecosystems within which the projects operate. Transparent nature-related disclosures are essential in driving positive change, guiding sustainable decision-making, and reinforcing environmental responsibility in all areas of operation.

This report marks MFLF’s first step toward aligning with the Taskforce on Nature-related Financial Disclosures (TNFD) recommendations. By outlining the organization’s current assessment of nature-related risks and opportunities, the report aims to integrate nature into governance, strategy, and financial decision-making.

Guided by TNFD’s LEAP approach, we evaluate our nature-related dependencies and impacts within DTDP, our major flagship development project. DTDP serves as a key reference point for identifying long-term risks and opportunities. Accordingly, we address TNFD’s core pillars: Governance, Strategy, Risk & Impact Management, and Metrics & Targets.

To ensure a structured and transparent disclosure approach, this report covers key areas:

- **Materiality & Nature-related Risks**
- **Location-based Environmental Considerations**
- **Scope of Disclosures & Methodologies**
- **Integration with Sustainability-related Reports**
- **Defined Time Horizons for Risk Assessment**
- **Stakeholder Engagement & Collaboration**

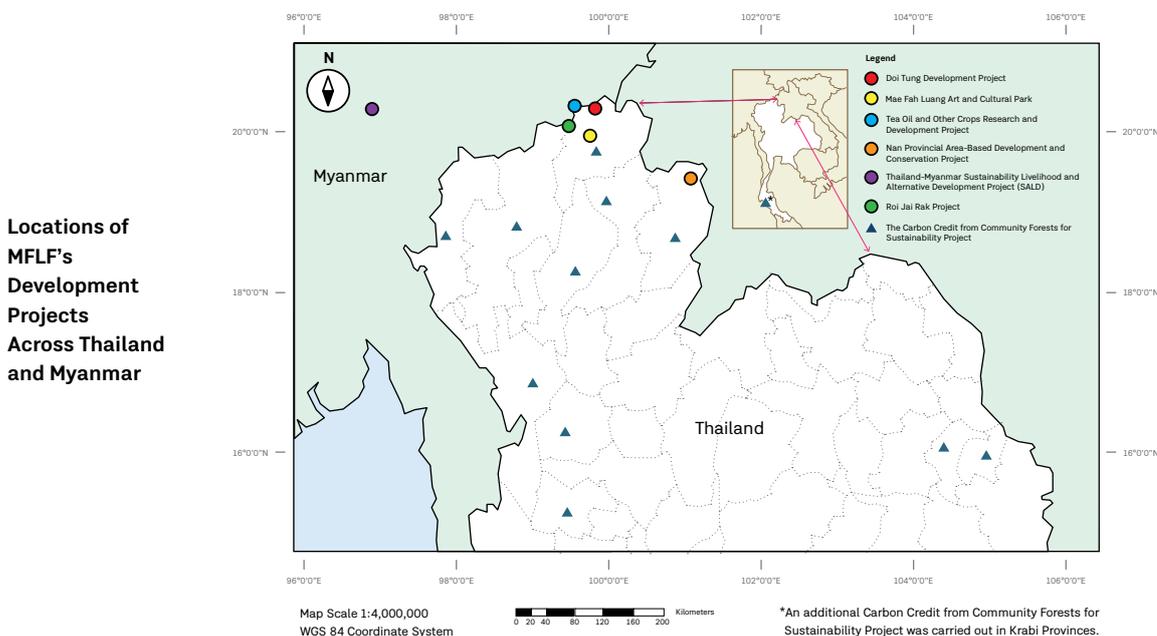
As this is the first year of reporting, we recognize the importance of continuous improvement. Future disclosures will incorporate more robust evidence, refined methodologies, and expanded assessment tools, aiming for more detailed alignment with TNFD’s evolving framework.

Materiality & Nature-related Risks

Nature stewardship is a key materiality consideration for the MFLF— encompassing natural resource management for the communities within the DTDP area as well as efforts to minimize environmental footprints within the DoiTung Social Enterprise* operations. The Foundation recognizes the increasing importance of nature-related dependencies and impacts in relation to our current four strategic pillars, and that nature stewardship is a key materiality focus area for our project prioritization and long-term planning on sustainability.

Geographic Considerations & Location-based Environmental Challenges

In Year 2025, the MFLF operates development projects across Thailand and Myanmar, coordinated from its headquarters in Bangkok, Thailand. Each initiative is tailored to the specific environmental and socio-economic challenges of its location, employing a geographically focused approach to sustainability and community development.



* DoiTung Social Enterprise operates as the business arm of the Foundation. “DoiTung” represents the brand, whereas “Doi Tung” refers to the geographical area.

Among these, the DTDP is prioritized for its scale, impact, and longstanding role as a model for integrated, area-based development. Established in 1988, DTDP began as a reforestation and community development initiative aimed at restoring degraded forest land and offering sustainable alternative livelihood to communities previously engaged in opium cultivation. Located in the mountainous terrain of Chiang Rai Province, the project covers 14,658 hectares across 29 villages and supports a population of approximately 11,000 people. In parallel with reforestation, MFLF introduced a holistic alternative development approach—building local capacities, generating alternative livelihoods, and enhancing education and healthcare services to support the transition to licit and sustainable ways of living.

Over three decades of reforestation efforts have transformed the Doi Tung landscape, with approximately 90 percent of the project area now covered by three distinct forest zones: “conservation forest”, which is strictly protected; “sustenance forest”, where local communities may access natural resources for household consumption under mutually agreed regulations; and “economic forest”, where high-value crops including macadamia and shade-grown arabica coffee are cultivated. This zoning model reflects the project’s guiding principle: people living in harmony with nature. The establishment of DoiTung Social Enterprise grew from this foundation, linking environmental regeneration with inclusive economic growth.

DoiTung Social Enterprise comprises five business units that collectively reinforce the project’s environmental, cultural, and economic goals. The **food processing** unit supports coffee and macadamia production, strengthening local agriculture. The **handicraft** unit fosters traditional craftsmanship, producing hand-woven textiles, mulberry paper, and ceramics. The **horticulture** unit oversees potted plants and tissue culture laboratory. The **café** unit operates coffee shops that prioritize locally sourced products and engage the community. The **tourism** unit supports hospitality and eco-tourism, including Mae Fah Luang garden and arboretum, DoiTung Lodge, and restaurants, building upon the area’s cultural heritage and natural endowment.



— Food



— Café



— Handicraft



— Horticulture



— Tourism

These operations leverage the Doi Tung area’s natural resource assets to generate revenue through the DoiTung brand operated by the Foundation, whose profits are in turn channeled towards uplifting the livelihoods of local communities through employment, entrepreneurship, and long-term development

The DTDP holds critical environmental importance due to its proven track record of restoration and conservation. Furthermore, its significant economic activities, primarily agricultural, are directly linked to the level of ecosystem services it provides.

This report adopts a location-specific, operations-driven assessment of nature-related issues relevant to the DTDP’s context with the aim of providing a precise and actionable disclosure.

— Scope of Disclosures & Methodologies

This report aims to address all core TNFD recommendations, ensuring alignment with the LEAP (Locate, Evaluate, Assess, Prepare) methodology for conducting systematic nature-related assessments. The scope of this disclosure specifically covers the business activities of the five units within DoiTung Social Enterprise—food processing, handicrafts, horticulture, café, and tourism—which operate under the DTDP.

To support this analysis, we leverage industry-standard tools, including:

- **ENCORE (Exploring Natural Capital Opportunities, Risks, and Exposures)**—to evaluate environmental dependencies and impacts
- **WWF Risk Filter Suite**—to assess exposure to nature-related risks across direct operations and value chains

Through these methodologies, MFLF seeks to identify, quantify, and disclose nature-related dependencies and risks associated with its operations, supporting the development of robust, context-specific risk management strategies for the DTDP.

— Integration with Broader Sustainability Reports

MFLF acknowledges the importance of harmonizing nature-related disclosures with broader sustainability frameworks. We commit to:

- **Aligning TNFD disclosures with existing sustainability reporting standards**
- **Integrating nature-related information within our annual report and public communications**
- **Strengthening transparency by linking nature-based insights with financial and governance disclosures**

This approach ensures holistic and interconnected reporting, demonstrating our long-term commitment to nature-positive development.

— Defined Time Horizons for Risk Assessment

To systematically assess nature risks and opportunities, MFLF adopts a time horizon approach, categorized as follows:

Time Horizon	Years	Key Considerations
Short-term	Within 5 years	Immediate operational risks (e.g., climate events, nature financing mechanism development, baseline ecosystem protections) aligned with Thai National Biodiversity Strategy and Action Plan (NBSAP) targets.
Medium-term	5-10 years	Scaling nature finance instruments, integrating ecosystem service valuation into asset management, and adapting climate resilience strategies.
Long-term	10+ years	Ecosystem-based adaptation, long-term infrastructure planning, and nature-inclusive business strategies shaped by evolving scientific insights.

By embedding short-, medium-, and long-term perspectives into our nature-related risk assessments, MFLF places high importance on proactive strategic planning and resilience building both for communities and business.

— Stakeholder Engagement & Collaboration

Effective nature-related disclosures depend on continuous dialogue with local communities and all stakeholders. MFLF prioritizes proactive engagement through:

- **Scheduling regular meetings with community and local representatives, in the forms of townhalls, focus groups, formal and informal consultations, among others**
- **Proactive monitoring of information, research, and environmental intelligence to respond to potential nature risks and opportunities**
- **Participation in key sustainability forums to stay informed on emerging nature issues and contribute to collective solutions**

This multifaceted engagement strategy fosters trust, shapes updated perspectives, and integrates local knowledge into our decision-making processes—ensuring inclusive and community-driven solutions.

2

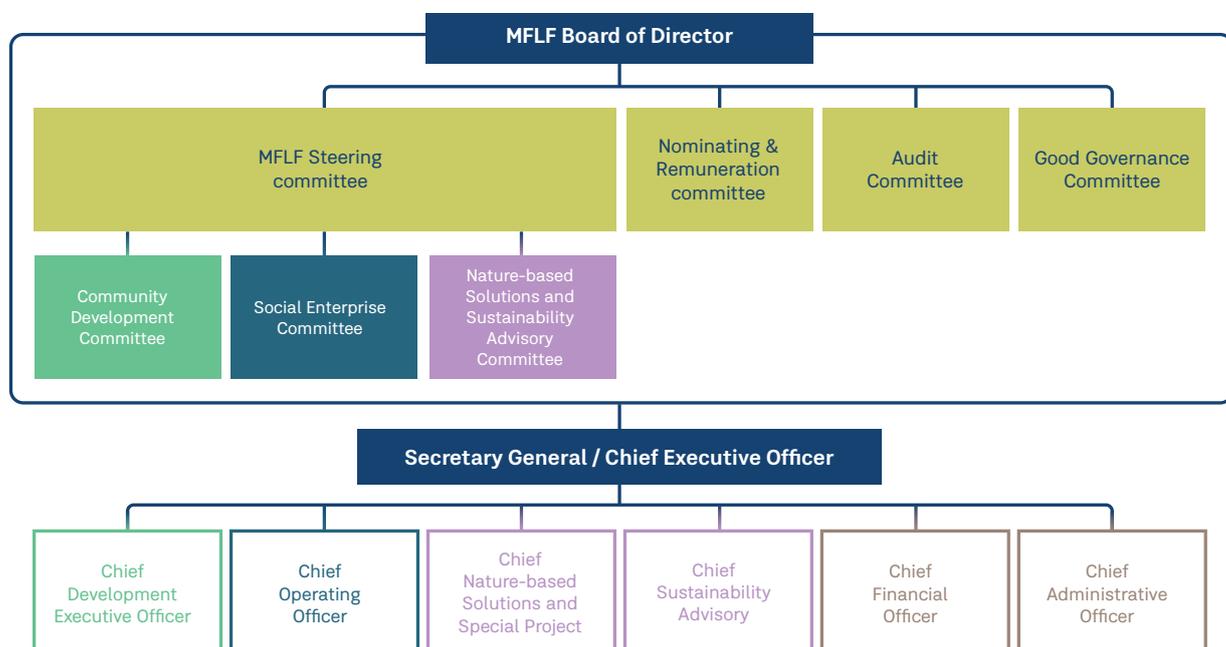
GOVERNANCE

The MFLF has established a comprehensive governance framework to ensure effective oversight of nature-related dependencies, impacts, risks, and opportunities. At the highest level, the Board of Directors provides strategic direction, supported by the MFLF Steering Committee, which ensures operational alignment across the Foundation’s initiatives.

The Nature-based Solutions and Sustainability Advisory Committee, which reports to the Board, plays a pivotal role in advising and monitoring nature-related strategies and initiatives. Governance responsibilities for assessing and managing nature-related risks are led by the Secretary General & Chief Executive Officer, with direct support from Chief Nature-based Solution and Chief Sustainability Advisory. The sustainability team, under the Head of Sustainability, is responsible for evaluating and assessing nature-related risks. These risks are reported periodically to the Nature-based Solutions and Sustainability Advisory Committee to ensure informed decision-making and continuous oversight.

Nature-related risks undergo evaluation every three years under normal circumstances. However, if internal factors—such as operational or location changes—or external developments, including regulatory shifts, advancements in nature assessment methodologies, or natural disasters affecting the Foundation, arise, a reevaluation process is conducted to maintain accuracy and relevance.

Beyond environmental governance, MFLF is committed to upholding human rights, particularly concerning Ethnic Minority Communities. Engagement efforts are facilitated by the Community Development Committee and Social Enterprise Committee, ensuring inclusive participation in decision-making processes. The Board and Management, through the Good Governance Committee, foster transparent dialogue and collaboration to address nature-related issues, promoting equitable and sustainable outcomes.

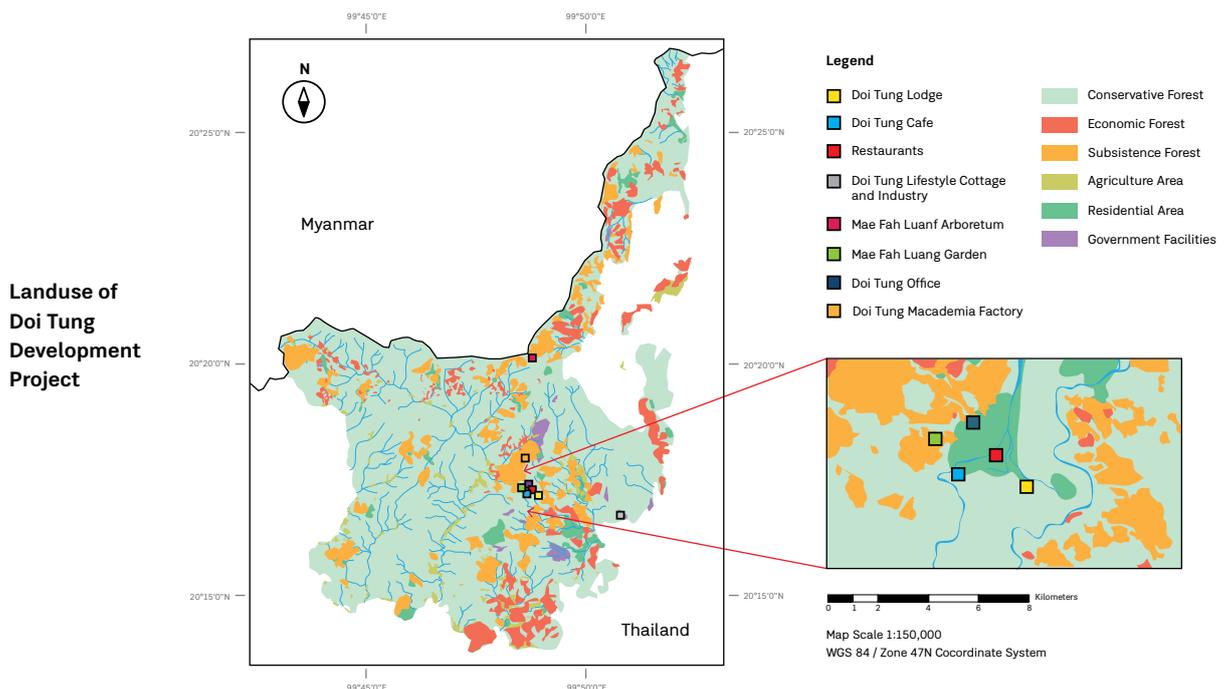


3 STRATEGY

MFLF strategy aligns with TNFD principles by adopting the LEAP approach, applying a structured methodology to assess and manage nature-related risks and opportunities. Utilizing TNFD-recommended tools which are ENCORE and the WWF Risk Filter Suite, MFLF gains comprehensive insights into the dependencies and impacts of its operations.

Priority Locations & Asset Distribution

The DTDP focuses on the DoiTung Social Enterprise, which integrates five distinct business units to drive economic, social, and environmental sustainability. The **food processing** unit integrates the full value chain of coffee and macadamia—from cultivation and processing to branding and marketing. The **handicrafts** unit preserves traditional knowledge and skills through the production of hand-woven textiles, mulberry paper, and ceramics, with activities spanning design, raw material sourcing, production, sales, and after-sales services. The **horticulture** unit produces a diverse range of potted plants, supported by nursery operations and in-house tissue culture laboratories. The **café** unit serves specialty coffee sourced from Doi Tung farmers, connecting visitors to the local landscape and economy. The **tourism** unit encompasses a range of attractions and services, including DoiTung Lodge, the royal villa, the Mae Fah Luang Garden and arboretum, restaurants and guided excursion activities. Together, these enterprises demonstrate how nature-based livelihoods can underpin inclusive, resilient, and environmentally responsible development.



— Material Locations & Environmental Significance

Since its launch in 1988, the DTDP has stood as MFLF's flagship project for area-based sustainable development. Situated at approximately 1,389 meters above sea level in Chiang Rai Province, the project began by addressing widespread environmental degradation and socio-economic challenges. At the time, only 28% of the original forest cover remained, with much of the area reduced to barren, deforested slopes due to unsustainable land use and illicit cultivation practices.

Over the past three decades, a comprehensive reforestation effort has dramatically transformed the landscape. Today, more than 90% of the DTDP area is forested, encompassing a mosaic of Conservation, Economic, and Sustenance forests. These forest zones are designed to balance ecological restoration with human well-being

This transition from degradation to regeneration exemplifies the project's ecosystem-based development model—one that prioritizes environmental integrity alongside sustainable livelihoods and inclusive local development.

— Significant Interface with Nature

Spanning 14,658 hectares and home to about 11,000 individuals from six ethnic groups, the DTDP maintains deep connections with nature across multiple dimensions. Reforestation efforts have contributed to habitat restoration, promoting ecological recovery and revitalizing biodiversity. Through decades of forest maturation, plant and animal diversity continues to rise, strengthening the DTDP's long-term environmental value. Positioned adjacent to an expanded national park, MFLF is committed to preserving the landscape through proactive stewardship, working collaboratively with the Department of National Parks, Wildlife and Plant Conservation to conserve and restore the area.

The local communities within the Doi Tung area rely on water availability, soil quality, and climate stability —factors that make DTDP operations and livelihoods vulnerable to the impacts of climate change and natural disasters. These risks underscore the necessity of sustainable ecosystem management to secure economic stability and resilience.

— Nature-related Dependencies & Impacts

DoiTung Social Enterprise comprises five business units, each encompassing a wide range of business processes. These processes have been systematically classified into 21 categories according to the International Standard Industrial Classification (ISIC) framework. Using the ENCORE tool, MFLF conducted a detailed analysis of each process, mapping out the specific nature-related dependencies and impacts associated with operational activities across all units. This approach supports a structured understanding of how each area of business interacts with ecosystems and natural capital. The assessment involved:

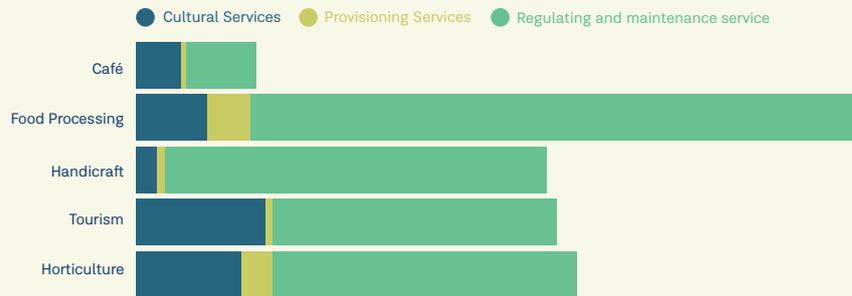
- Evaluating ecosystem service dependencies for each business process, including the identification and materiality rating of relevant ecosystem services.
- Identifying environmental pressures generated by each process, including the number of pressures affecting different natural assets and the materiality rating of each pressure.
- Applying a materiality rating filter to highlight dependencies and pressures rated as “high” or “very high,” enabling a clearer understanding of the most significant interactions between business operations and natural systems.

This structured analysis supports a more targeted approach to managing nature-related risks and enhancing sustainability performance across the enterprise.

Dependencies

An assessment, by ENCORE, of activities across DTDP's five business units highlights a strong dependence on regulating and maintenance services, followed by cultural services, and provisioning services.*

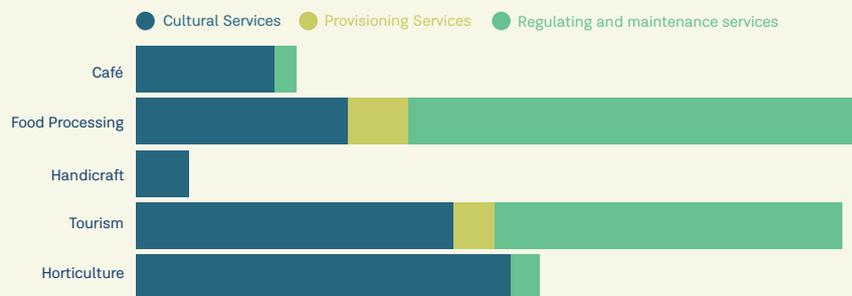
Dependencies on Ecosystem Services by Business Unit



Cultural services play a significant role, particularly in tourism-related activities such as accommodation, gardens, and restaurants. These services are closely tied to local customs and knowledge, shaping brand identity and enhancing market differentiation. Regulating and maintenance services are essential for sustaining agriculture, horticulture, and food processing operations. These services ensure stable production and resource availability through fertile soils and pollinators for crop health, stable water cycles for irrigation and processing, and air and water quality standards for environmental compliance. Provisioning services, including freshwater, natural fibers, and minerals, underpin DTDP's economic activities, providing necessary inputs for various business operations.

Dependencies on Ecosystem Services by Business Unit

(covering materiality rating, H and VH)

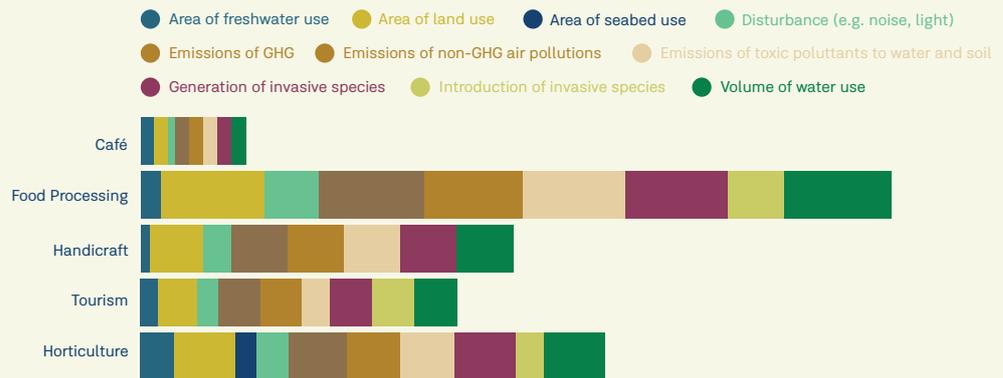


Given the high and very high materiality rating of ecosystem services within DTDP, their long-term viability is critical. Regulating and maintenance services hold particular importance due to their foundational role in supporting other services. Strong soil, water, and air quality directly influence the productivity of food processing activities, which begin at the farm level. Risk assessments further highlight the necessity of prioritizing regulating and maintenance services, reinforcing the need for enhanced sustainability measures.

***Regulating and Maintenance Services:** Benefits from ecosystem processes that support life, like clean air/water, pollination, and climate regulation. **Cultural Services:** Non-material benefits from nature, such as recreation, aesthetic inspiration, and spiritual enrichment. **Provisioning Services:** Tangible products obtained from ecosystems, including food, fresh water, timber, and medicinal resources.

Pressures

Pressures to Nature by Business Unit

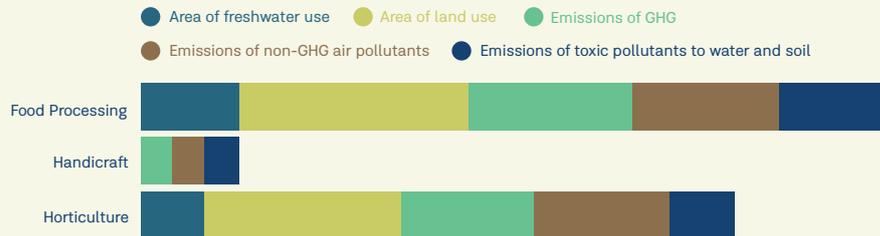


In line with TNFD’s definition of impact drivers, ENCORE has identified key environmental pressures associated with DTDP operations, highlighting potential risks to ecosystems, biodiversity, and human well-being. An analysis of overall activities indicates that land use, greenhouse gas emissions, the introduction of invasive species, and water consumption represent the most significant sources of pressure.

Each business unit contributes to environmental strain at varying levels. Food processing, tourism, and handicrafts emerge as the top three contributors based on cumulative pressure assessments.

Pressures to Nature by Business Unit

(covering materiality rating, H and VH)



Focusing on high and very high materiality ratings, food processing, horticulture, and handicrafts are the primary business units facing substantial ecological pressures. Key concerns include water resource depletion due to agricultural consumption, waste accumulation affecting soil and water quality, and land conversion contributing to climate change and habitat loss.

The findings highlight high-impact operational units, offering valuable guidance for MFLF to prioritize interventions, refine its sustainability strategy, and enhance environmental stewardship. Leveraging the ENCORE tool enabled a comprehensive view of nature-related dependencies and pressures across business activities, serving as a strong foundation for understanding the relationship between operations and ecosystems. To ensure relevance and accuracy, MFLF facilitated an internal validation session with operation staff to review and interpret the ENCORE results, allowing for more informed and impactful strategy development.

— Dependencies, Impacts, Risks and Opportunities

As MFLF continues to integrate nature-related considerations into its strategic framework, a comprehensive evaluation of risks and opportunities is essential for ensuring long-term sustainability. The DTDP faces both physical and transitional risks, driven by environmental changes, regulatory shifts, and evolving market conditions. Addressing these risks requires proactive strategies, emphasizing resilience-building and adaptation efforts.

Conversely, these challenges present valuable opportunities, allowing MFLF to leverage nature-positive solutions, sustainable financing mechanisms, and ecosystem-based innovations that enhance both environmental integrity and economic viability. The following tables provide a detailed analysis of:

- **Physical Risks (acute and chronic) and their implications for DTDP**
- **Transitional Risks arising from policy, market, and societal shifts**
- **Opportunities that align with sustainability and long-term growth**

Each table outlines four key dimensions: the impact drivers, the associated effects on DTDP, the timeframe based on MFLF's defined risk assessment horizons, and the corresponding actions taken to mitigate risks or realize opportunities. Time horizons are categorized as short term (within 5 years), medium term (5–10 years), and long term (beyond 10 years), each with specific considerations ranging from immediate operational vulnerabilities to ecosystem-based adaptation and climate-resilient development. These timeframes guide prioritization and planning while supporting adaptive responses to dynamic environmental and socioeconomic conditions.

The risks and opportunities presented here are those with the potential to generate both positive and negative impacts on operations, reflecting the dynamic interplay between environmental dependencies and the operational landscape. It is important to note that the identified impacts are assessed irrespective of existing mitigation or adaptation measures. This ensures a realistic understanding of underlying exposure and helps prioritize nature-related risks and opportunities in a transparent and forward-looking manner.

Physical Risks

Dependency / Impact	Impact Driver	Impacts on the DTDP	Timeframe	Actions/ Responses
Dependency (Acute) 	Water Availability	<p>Water shortages in the DTDP area could lead to operational challenges, affecting irrigation, production, and increasing costs.</p> <ul style="list-style-type: none"> • Food Processing: Reduced crop yields due to water stress, increased irrigation costs, potential quality issues affecting processing and packaging. • Horticulture: Difficulty maintaining optimal growing conditions in nurseries and tissue culture labs, leading to reduced plant production. • Horticulture (Gardens, Arboretum): Impact on aesthetics and plant health, potentially affecting visitor numbers and satisfaction. • Café: Potential for water shortages affecting operations, increased costs for alternative water sources. • Handicraft: Potential disruption to water-intensive processes in paper and ceramic production. 	Short term to medium term	<ul style="list-style-type: none"> • To conduct detailed Water Risk Assessment, including collecting, assessing and evaluating water stress data in the respective operational area • To analyze and increase the amount of reuse water • To explore potential nature-based solutions as a means to implement water-efficient irrigation systems
Dependency (Acute) 	Water Flow Condition	<p>Natural water flow regulates rivers, groundwater, and lakes, ensuring a stable water supply and reducing water shortage risks for operations and stakeholders.</p> <ul style="list-style-type: none"> • Food Processing (Irrigation): Potential for flooding or drought affecting irrigation systems and crop production in coffee and macadamia farm • Horticulture (Gardens, Arboretum): Potential for flooding or erosion affecting visitor experience and infrastructure. • Handicraft: Potential for flooding affecting production facilities and raw material storage. 	Medium term to long term	<ul style="list-style-type: none"> • To study the impact of the existing irrigation system and water defragmentation • To communicate with communities on the usage of water and water flow.
Dependency (Acute) 	Landslides	<p>Landslides in the DTDP area, especially during monsoon season, threaten communities, disrupt infrastructure, and damage agriculture, leading to economic losses.</p> <ul style="list-style-type: none"> • Infrastructure Damage: Roads, bridges, buildings, and irrigation systems can be damaged or destroyed, disrupting operations. • Supply Chain Disruptions: Transportation of raw materials and finished products can be halted. • Worker Safety: Risk of injury or death to workers and local communities. • Agricultural Productivity: Soil erosion and loss of fertile land can negatively impact crop yields. 	Short term	<ul style="list-style-type: none"> • To establish disaster preparedness and response committee (Forest Fire, Landslides, Storm) • To develop and implement disaster management plan (prevention, mitigation, evacuation, adaptation) covering interventions for short, medium and long terms • To maintain strong engagement with related government agencies and local communities –to address spontaneous actions when there is any emergency in the area. • To ensure selective evacuation/retaliation/rehabilitation activities are rehearsed spontaneously.
Dependency (Acute) 	Wildfire Hazard	<p>Wildfires in the DTDP area, especially during the dry season, threaten forests, air quality, health, and biodiversity due to drought and human activities. The dry climate and flammable vegetation heighten the risk.</p> <ul style="list-style-type: none"> • Property Damage: Buildings, equipment, and crops can be destroyed. • Air Quality Degradation: Impacts worker health and tourism, contributes to PM2.5 pollution. • Loss of Biodiversity: Impacts ecosystem services and long-term sustainability. • Supply Chain Disruptions: Transportation and access to raw materials can be affected. 	Short term	As above

Physical Risks

Dependency / Impact	Impact Driver	Impacts on the DTDP	Timeframe	Actions/ Responses
Dependency (Chronic) 	Water Purification Condition	<p>Water purification services are essential for DTDP operations, maintaining surface water quality, reducing treatment costs, and ensuring a clean, reliable supply.</p> <ul style="list-style-type: none"> • Food Processing: Increased water treatment costs, potential for contamination affecting product quality. • Horticulture: Need for higher water purification standards, increasing costs. • Tourism: Impact on drinking water quality and hygiene, potentially affecting visitor health and satisfaction. • Handicraft: Potential for water quality issues affecting product quality and processing. 	Medium to long term	<ul style="list-style-type: none"> • To monitor water quality regularly
Impact (Acute) 	Volume of water use	<p>Efficient water use is vital for the DTDP, affecting production, supply chains, and sustainability. Inefficiencies can drive up costs, cause shortages, and harm brand reputation if seen as unsustainable.</p>	Short term	<ul style="list-style-type: none"> • To conduct detailed Water Risk Assessment, including collecting, assessing and evaluating water stress data in the respective operational area • To explore potential nature-based solutions as a means to implement water-efficient irrigation systems
Impact (Acute) 	Generation and release of solid waste	<p>Improper solid waste disposal at DTDP can lead to environmental damage, contamination, and higher greenhouse gas emissions. Effective waste management is essential to reduce costs, prevent pollution, protect brand reputation, and avoid regulatory fines.</p>	Medium term to long term	<ul style="list-style-type: none"> • To maintain the achievement of zero waste to landfill in project area. • To mobilize all local communities in DTDP to keep improving their Zero Waste to Landfill projects continuously. • To adopt circularity framework into Doi Tung business where applicable.
Impact (Acute) 	Emissions of GHG	<p>GHG emissions from land use, deforestation from either manmade or natural causes, agriculture, and industry accelerate climate change, endangering ecosystems, water resources, and agriculture. This leads to extreme weather, water scarcity, and biodiversity loss, increasing operational costs, regulatory risks, and reputational concerns.</p>	Medium term to long term	<ul style="list-style-type: none"> • To ensure a successful commitment to Net Zero by 2050 • To set up Zero Emission Reduction Committee and annual GHG Emission goal
Impact (Chronic) 	Area of freshwater use	<p>DTDP activities affecting freshwater ecosystems—such as check dams, stream diversion—can alter water flow, impacting quality, biodiversity, and sustainability. Poor management may lead to reduced water availability, degraded water quality, biodiversity loss, flooding or drought risks, regulatory restrictions, and reputational concerns.</p>	Short term to medium term	<ul style="list-style-type: none"> • To monitor area of freshwater use timely in terms of quality, quantity and the flow.

Transitional Risks

Dependency / Impact	Impact Driver	Impacts on the DTDP	Timeframe	Actions/ Responses
Risk (Acute) 	Reputational Risk – Brand Reputation	Pressures on biodiversity, water, soil, and cultural heritage can harm the DTDP’s reputation, triggering stakeholder distrust and regulatory scrutiny. Ignoring ecosystem degradation may lead to brand damage, loss of social license, protests, hiring challenges, legal risks, and stricter regulations.	Short term	<ul style="list-style-type: none"> To communicate transparently about the DTDP’s sustainability performance. To strengthen engagement with stakeholders, support local communities and implement ethical labor practices by adopting prevailing safeguards and frameworks.
Risk (Acute) 	Policy & Regulatory Changes	Policy changes—new or enforced—aim to enhance nature protection or reduce environmental harm, including stricter land use, water management, waste disposal, and biodiversity regulations. <ul style="list-style-type: none"> Food Processing: Increased compliance costs for sustainable farming practices, potential limitations on land use or water access, changes in fertilizer/pesticide regulations. Café: Potential impact on sourcing (if suppliers are affected), changes in waste management regulations. Handicraft: Restrictions on sourcing raw materials (e.g., certain types of wood, natural dyes), higher costs for eco-friendly production processes. Horticulture: Stricter regulations on plant collection, potential limitations on the use of certain chemicals or growth mediums. Tourism: Potential restrictions on visitor numbers in sensitive areas, need for investment in sustainable tourism infrastructure (e.g., waste management, water conservation) 	Short term to long term	<ul style="list-style-type: none"> To maintain awareness of policy and regulatory transitions and establish appropriate mechanisms to ensure project compliance
Risk (Acute) 	Market	Ignoring nature-related and social factors in operations may risk competitiveness, pose regulatory challenges, and decrease stakeholder trust. <ul style="list-style-type: none"> Market demand higher standard of social/environment responsibility, or certain certificates may increase operation cost. 	Short term to long term	<ul style="list-style-type: none"> To proactively monitor changing markets and consumers’ preferences.
Risk (Chronic) 	Technology	The shift toward low-emission products and sustainable technologies is transforming markets. The DTDP must adapt to green innovations to remain competitive, as failing to do so could result in financial risks and reputational damage.	Short term to long term	<ul style="list-style-type: none"> To proactively monitor new technologies and innovations that navigate changing market dynamics.
Risk (Chronic) 	Ecosystem Stability	The collapse of terrestrial ecosystem functions, including habitat degradation and species extinction, threatens vital services like water regulation, pollination, and soil fertility. This disruption exposes the DTDP to significant operational and financial risks tied to nature dependencies.	Medium term to long term	<ul style="list-style-type: none"> To prioritize ecosystem restoration and sustainable practices, while integrating robust monitoring, community engagement, and financial risk management.

Opportunities

Risk / Opportunity	Driver/s	Opportunities for the DTDP	Timeframe
Opportunity 	Reputational – Brand Reputation	The DTDP's commitment to sustainable development and community engagement provides a strong foundation for building a positive reputation. It helps enhance brand reputation, customer loyalty, stakeholder relationships, access to markets and funding, and positive impact on employees' dedication.	Short term to long term
Opportunity 	Technology (Increased operational efficiency, e.g. deployment of resource efficient innovations and technologies, Uptake of new technologies in supply chain)	The implementation of innovative, environmentally responsible technologies within DTDP's operations and supply chains presents opportunities to enhance operational efficiency and sustainability performance. Specifically, integration of resource-efficiency technologies, e.g. water and energy circularity and nature-based solutions can contribute to a reduced environmental footprint and cost optimization.	Short term to long term
Opportunity 	Capital Flow and Financing (Increased demand from financial institutions for sustainable assets)	The DTDP's proven commitment to sustainable development presents a compelling opportunity for investors seeking assets connected to positive nature impacts. It enables the project to secure capital for sustainable projects, benefit from reduced financial charges for nature-positive initiatives and enhance investor confidence in meaningful contribution to prevailing national and global safeguard frameworks.	Short term to long term
Opportunity 	Ecosystem protection, restoration and regeneration	The watershed location of the DTDP and restoration achievements make ecosystem protection a significant opportunity. Activities such as biodiversity monitoring and landscape restoration, particularly Sustenance and Conservation Forest types, offers long-term benefits to the project and surrounding communities. It helps enhance the reputation on environmental stewardship, improved ecosystem services for agriculture and tourism, access to carbon markets through reforestation and afforestation, and increased biodiversity in the region.	Medium term to long term
Opportunity 	Market	<p>Growing demand for sustainable products, fueled by environmental and social awareness, is reshaping markets.</p> <ul style="list-style-type: none"> • Food Processing: Increased demand for sustainably sourced and produced products, potential price premiums for eco-friendly coffee and macadamia. • Café: Growing consumer preference for café with a strong sustainability commitment, potential for increased sales of eco-friendly products. • Handicraft: Rising demand for ethically made and environmentally friendly handicrafts, potential for new markets. • Horticulture: Increased demand for native and drought-resistant plants, potential for sales growth in the landscaping and restoration sectors. • Tourism: Growing interest in eco-tourism and cultural tourism, potential for increased visitor numbers. 	Short term to long term

4

RISK AND IMPACT MANAGEMENT

Understanding the significance of nature-related risks and opportunities in the DTDP's operations, this section outlines our systematic approach to identifying, assessing, and prioritizing nature dependencies, impacts, risks, and emerging opportunities. TNFD framework, LEAP approach, insights from ENCORE, the WWF Risk Filter Suite, and expert analysis were integrated to ensure effective risk assessment and mitigation. ISO 31000 risk management framework was used to enhance the risk assessment and support informed decision-making.

— Key Risk Management Steps:

- **Risk Identification:** Nature-related dependencies and impact risks are systematically mapped using ENCORE and the Risk Filter Suite to ensure a thorough assessment.
- **Risk Analysis:** Identified risks undergo evaluation based on probability and potential impact, allowing for the determination of impact and probability. The scale of probability and impact for dependencies and impact risks were defined separately.
- **Risk Evaluation:** Risks are prioritized by analyzing operational exposure and materiality, ensuring that critical threats receive the necessary attention and resources.
- **Risk Treatment:** Mitigation measures—including avoidance, transfer, acceptance, or direct intervention—are implemented to align with both short-term operational needs and long-term strategic goals.
- **Monitoring & Review:** Risk treatments are continuously tracked and refined, aimed at adaptability to evolving conditions.
- **Communication & Consultation:** Transparent stakeholder engagement fosters collaboration and informed decision-making throughout the risk management process.

Heatmap: Qualitative Ratings for Dependencies and Impacts

Probability / Impact	Rare	Unlikely	Possible	Likely	Highly Likely
Critical		<ul style="list-style-type: none"> Ecosystem condition Water availability Reputational risk 	<ul style="list-style-type: none"> Soil condition Ecosystem stability Policy & regulatory change 	<ul style="list-style-type: none"> Tropical cyclone 	<ul style="list-style-type: none"> Wildfire Technology
Severe		<ul style="list-style-type: none"> Water purification 		<ul style="list-style-type: none"> Pests & diseases GHG emission 	<ul style="list-style-type: none"> Air condition Landslides Range rarity
Moderate		<ul style="list-style-type: none"> Extreme heat Pollution emission Land use 			
Minor		<ul style="list-style-type: none"> Pollination Herbicide Resistance Volume of water use Invasive species Solid waste Forest canopy loss Market risk 		<ul style="list-style-type: none"> Water flow condition Area of freshwater use 	
Negligible			<ul style="list-style-type: none"> Non-GHG emission 		

Assessing identified nature-related risks requires accurate and sufficient data to ensure a comprehensive evaluation. Proper identification and collection of relevant data are essential, though forecasting financial impacts across different scenarios may not yet be feasible. Over the coming year, efforts will focus on establishing baseline data for nature-related risks while leveraging existing information to implement mitigation, transfer, avoidance, and transformation strategies across ongoing operations.

5

METRICS AND TARGETS

MFLF is committed to accountability in managing the environmental impacts of its operations by establishing measurable targets aligned with its core sustainability strategy and subject to regular review.

In line with the TNFD framework, MFLF has systematically begun collecting key data to assess, monitor, and manage nature-related risks and opportunities. These metrics are integrated into the broader environmental management framework to ensure alignment with long-term sustainability objectives.

For this first report, MFLF outlines specific targets for promoting environmental sustainability and minimizing ecological impact as detailed below.

Target Areas	Metrics (*2025)	2030 (Short-term)	2040 (Medium-term)	2050 (Long-term)
GHG Reduction Schemes – “Net Zero”	<ul style="list-style-type: none"> Total GHG Emissions (TCo2e/year) % progress towards Net-zero Public disclosure (Emission Report) 	<ul style="list-style-type: none"> 27% reduction from base year 	<ul style="list-style-type: none"> 60% reduction from base year 	<ul style="list-style-type: none"> Net Zero
Sustainable Water Resource Management	<ul style="list-style-type: none"> Established study and aligned policy commitments % reduction of water use % reuse water Endorse sustainable water stewardship commitment – water efficiency practices 	<ul style="list-style-type: none"> Improve water management in all aspects under water stewardship standards Increase efficiency of water in all operation 	<ul style="list-style-type: none"> Ecosystem restoration and watershed management Manage all activities to reach goal of water use 	<ul style="list-style-type: none"> Sustainable watershed management and climate resilience
Waste Circular Economy Management – “Zero Waste to Landfill”	<ul style="list-style-type: none"> Established baseline for waste reduction and diversion % waste reduction in key operations % waste repurposed/ recycled wastes in key operations Endorse robust waste reduction initiatives and commitment 	<ul style="list-style-type: none"> Maintain Zero Waste to Landfill Mainstream circularity policy to reach short term target 	<ul style="list-style-type: none"> Reduction of solid waste Increase Org. Circularity Index to reach medium term target 	<ul style="list-style-type: none"> Circularity is integrated and practiced at every level of operations
Disaster Preparedness and Management	<ul style="list-style-type: none"> Mapping of disaster-prone key operational areas Develop real-time monitoring mechanisms Research on erosion control solutions/ initiatives Endorse formation of disaster management committees 	<ul style="list-style-type: none"> % of population covered by disaster contingency plans % of critical infrastructure assessed and retrofitted for climate risks Early warning systems in place Average time for emergency response mobilization 	<ul style="list-style-type: none"> Numbers of disaster that were prevented or managed resiliently Disaster preparedness plan is regularly reviewed and rehearsed. 	<ul style="list-style-type: none"> Numbers of disaster that were prevented or managed resiliently Resilient supply chains and infrastructure
Ecosystem Stability	<ul style="list-style-type: none"> Ecosystem Integrity Index \$ to community from ecosystem services Species abundance and richness Quality of critical natural resources (biotic and abiotic) 	<ul style="list-style-type: none"> Established ecosystem service valuation baseline Completeness of conservation & restoration projects 	<ul style="list-style-type: none"> Increase in ecosystem service value Area (hectares) of restored ecosystems used from flood/ fire/drought mitigation Increased income generated from ecosystem service 	<ul style="list-style-type: none"> Climate adapted, nature positive and disaster resilient operations



มูลนิธิแม่ฟ้าหลวง ในพระบรมราชูปถัมภ์
Mae Fah Luang Foundation under Royal Patronage

1875/1 Rama IV Road, Lumpini,
Pathumwan, Bangkok 10330

www.maefahluang.org