

Summary of Identification and Evaluation of Nature-related Issues

August 7th, 2024

Following the publication of the TNFD's recommendations in September 2023, Oji Holdings conducted an identification and assessment of the Oji Group's nature-related issues utilizing the LEAP approach formulated by the TNFD.

● Identification of Priority Locations

Oji Holdings analyzed its value chain related to forests—the core of its business—and assessed its dependencies and impacts on nature, using ENCORE, a tool recommended by the TNFD. The findings indicated a notably high dependency and impact on nature by forestry business (Table 1).

Consequently, Oji Holdings evaluated the proximity of its forestry operations (Figure 1) to areas important for biodiversity, and also evaluated the biodiversity importance, biodiversity integrity, forest cover change and water risk of the adjacent areas (Table 2).

Considering these results and the size of each operation*, CENIBRA (located in Brazil) was identified as a location with high potential for significant nature-related issues.

* More than 30% of the wood products procured by the Oji Group come from forests managed by CENIBRA.

Table 1: Assessment using ENCORE

Sectors	Dependencies on ecosystem services																				
	Animal-based energy	Fibres and other materials	Genetic materials	Ground water	Surface water	Maintain nursery habitats	Pollination	Soil quality	Ventilation	Water flow maintenance	Water quality	Bio-remediation	Dilution by atmosphere and ecosystems	Filtration	Mediation of sensory impacts	Buffering and attenuation of mass flows	Climate regulation	Disease control	Flood and storm protection	Mass stabilisation and erosion control	Pest control
Large-scale forestry	VL	VH		VH	VH		H	H		H		M		VL			VH	H	VH	VH	H
Production of forest and wood-based products				H	VH					M									M	L	
Production of paper products		M		VH	VH					M							VL				
Paper packaging production												L	L								
Biomass energy production		VH		M	M					M	L	VL		VL			VL		M	L	

Sectors	Impact drivers					
	Terrestrial ecosystem use	GHG emissions	Water pollutants	Soil pollutants	Water use	Non-GHG air pollutants
Large-scale forestry	VH	H	H			
Production of forest and wood-based products	H	H	H	H		
Production of paper products			H	H	VH	M
Paper packaging production			H	H	VH	M
Biomass energy production	H	H	H	H	H	H

VH	Very High
H	High
M	Medium
L	Low
VL	Very Low

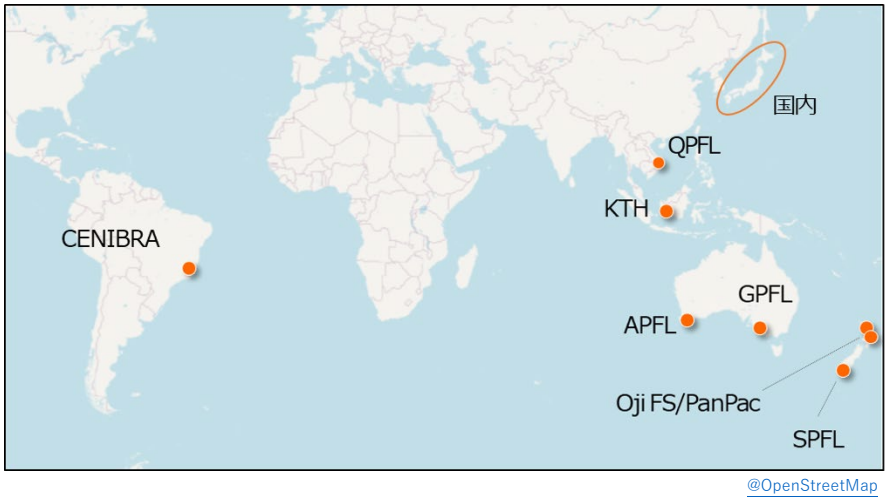


Figure 1: Forestry operations

Table 2: Evaluation of state of nature

Operations			Evaluation of state of nature				
Company	Country	Area (thousands of ha)	Biodiversity importance	Proximity to areas important for biodiversity	Biodiversity integrity	Forest cover decline	Water risk
CENIBRA	Brazil	250	High	High	High	Low	Low
KTH	Indonesia	82	Medium	Low	High	High	Low
APFL	Australia	5	High	Low	High	Medium	Low
GPFL	Australia	3	Medium	Low	High	Low	Medium
PanPac, OjiFS	New Zealand	48	Medium	Medium	High	Medium	Low
SPFL	New Zealand	13	Low	Medium	High	Low	Low
QPFL	Vietnam	10	Medium	Low	High	Medium	Medium
-	Japan	188	High	High	High	Low	Medium

● Dependencies and Impacts

Oji Holdings analyzed its priority locations, the CENIBRA's forestry operations, for dependencies and impacts on nature.

Dependencies on ecosystem services and their pathways were identified as shown in Table 3. The intensity of dependencies was quantified based on three factors: loss of inputs, financial loss and impact on society resulting from the loss of ecosystem services. Biomass provisioning and water supply, crucial ecosystem services for forestry, directly influence operational availability. Regulation of climate, soil and water flow also constitutes important ecosystem services.

The impact drivers of forestry activities and their impacts on nature, society and operations are identified in Table 4. Impacts were evaluated using metrics with three factors: spatial extent, duration and magnitude. Within the range of impact drivers of forestry, land use holds particular importance. CENIBRA owns and manages a large area of land, and the way it is managed is directly related to the state of nature. The impact intensity was determined to be positive.

Table 3: Identification and evaluations of dependencies

Ecosystem services	Dependency pathway	Loss of inputs	Financial loss	Impact on society
Biomass provisioning	Forestry is directly dependent on tree growth.	High	High	Low
Water supply	In addition to seedling production and dust control, tree growth depends on water.	High	Medium	Medium
Soil and sediment retention	Soil stability prevents erosion, which can topple trees and weaken roots.	Medium	Medium	Low
Flood mitigation	Located in topographical conditions that are not prone to extreme flooding, which can affect productivity.	Low	Low	Low
Climate regulation	Temperature, rainfall and wind speed effect tree growth.	Medium	High	High
Pollination	Plantation trees do not depend on pollination, but are linked to the health of the surrounding ecosystem.	Low	Low	Medium
Soil quality regulation	Soil fertility and soil structure affect nutrient supply and water holding capacity, which in turn affect tree growth.	Medium	High	Medium
Water flow regulation	Maintaining water flows and cycles affects the stability of water availability and is necessary for to maintain forests.	Medium	High	High
Disease control	Spread of pathogens can affect health and well-being of people in the surrounding area, but there have been no disease outbreaks.	Low	Low	Medium
Pest control	Pest control function reduces the use of pesticides and herbicides.	Medium	Medium	Medium
Bioremediation	It breaks down, reduces and detoxifies contaminants, contributing to the purification and restoration of the environment.	Low	Low	Low

	Low	Medium	High
Loss of inputs	Operation can continue as is or with minor modifications	Operation can continue only with important modifications (e.g. slower production or use of substitutes)	Disruption prevents operation
Financial loss	Disruption does not have potential to materially affect profits	Disruption has potential to materially affect profits	There is a reasonable possibility that disruption could affect financial viability
Impact on society	Impacts are temporary and minor	Potential impacts may significantly constrain access to ecosystem services	Reasonable possibility that societal access/use of ecosystem services is prevented

Table 4: Identification and Evaluation of impacts

Impact drivers	Impacts	Metrics	Direction of impacts	Measured value	Spatial extent	Duration	Magnitude
GHG emissions and absorption	The balance between GHG emissions from the use of forestry and other machinery and the absorption and stock of GHG by trees has an impact on global climate change. As climate change progresses, there is a possibility that timber production will slow, water intake will be restricted, and the severity of disaster damage will increase.	GHG emissions from the use of forestry and other machinery	-	62,014 tCO ₂ /yr	High	High	Low
		GHG absorption by trees	+	1,519,520 tCO ₂ /yr			
		Carbon stock in forests	+	44,913,879 tCO ₂			
Land use	Land use has a direct impact on biodiversity and various ecosystem services. If deforestation occurs, there is a possibility of soil degradation, changes in water flow, and increased disaster damage. On the other hand, proper land management can improve the multifaceted function of forests.	Area of own forest	-/+	254,010 ha	Medium	High	High
		Acquisition of forest certification	+	98%			
		Area of conservation forest	+	106,505 ha			
		Area of restoration and recovery activities	+	359 ha/yr			
Pollution	Excessive use of pesticides and fertilizers can cause eutrophication in soil and rivers, leading to ecosystem degradation. On the other hand, when used in appropriate amounts, they can improve soil health.	Use of pesticides	-/+	124 t/yr	Low	Medium	Low
		Use of fertilizer	-/+	38,467 t/yr			
Waste use	Excessive water intake lowers river levels and leads to aquatic ecosystem degradation. It can also reduce the availability of water in surrounding areas.	Water intake for seedling production, dust control, etc.	-	216,410 m ³ /yr	Low	Low	Low

	Low	Medium	High
Spatial extent	Occurs in a small area on a specific aspect of biodiversity	Occurs in a moderate area on a specific aspect of biodiversity	Occurs in a large area on a specific aspect of biodiversity
Duration	Impact is limited, recovers in 1-2 years	Impact continues for 2-10 years	Impact continues for more than 10 years
Magnitude	Magnitude of impact driver is small compared to biodiversity sensitivity	Magnitude of impact driver is moderate compared to biodiversity sensitivity	Magnitude of impact driver is large compared to biodiversity sensitivity

● Risks and Opportunities

Oji Holdings identified nature-related risks and opportunities arising from dependencies and impacts (Tables 5 and 6).

Nature-related risks include instability of forest resource supply and rising costs due to climate change, reduced availability of ecosystem services and increased regulation due to ecosystem degradation, and disruption of business activities and loss of assets due to natural disasters. Nature-related opportunities include enhanced reputation and competitiveness through conservation and restoration of natural capital, and increased demand for renewable resources and nature-based products.

Table 5: Identification of Risks

Category	Risks	Financial effects	Measures
Physical risk	Increased temperatures and hotter days	Increased costs and decreased sales due to lower wood productivity	Mitigate climate change
	Decreased precipitation and longer droughts	Increased costs and decreased sales due to lower wood productivity	Install reservoirs; plow soils
	Increased frequency of flooding	Restricted operations due to submerged trees and soil runoff	Install reservoirs, plow soils
	Worsening fire weather and increased frequency of forest fires	Increased reforestation and fire prevention costs	Mitigate climate change; prevent fire
	Accidental water pollution from external factors such as tailings dam failures	Restricted operations due to water intake and drainage restrictions	Monitor water quality
	Decreased soil quality due to soil compaction by forestry machinery and absorption of soil nutrients by plantation trees	Increased costs and decreased sales due to lower wood productivity; increased fertilizer and pesticide costs	Select appropriate fertilizers; plow soils
	Significant loss of biodiversity due to inappropriate land management	Reduced access to ecosystem services due to ecosystem degradation; liability for biodiversity loss	Avoid deforestation; establish conservation forests; protect water sources
Transition risk	Stricter reporting requirements on nature-related risks and impacts	Increased monitoring costs; fines due to delays in response	Obtain certifications, comply with new regulations, develop monitoring technologies
	Stricter laws on rights, permits, and allocations for natural capital	Restriction of logging, water intake and other operations	Reduce water intake
	Increased negative perceptions of deforestation and misperceptions due to simplified forest assessment tools (e.g., confusion between permanent deforestation and properly-managed forestry)	Reduced demand due to loss of reputation	Publish report of satellite analysis for forest

Table 6: Identification of Opportunities

Opportunities	Financial effects	Measures
Improved efficiency in the use of wood and water	Reduced costs; improved resilience to resource scarcity; reduced negative impacts of land and resource use	Development of wood applications; resource recycling
Utilization of degraded land	Improved resilience to resource scarcity; avoided negative impacts of land use; improved soil health; improved quality of ecosystem services	Reforestation
Conservation and restoration of ecosystems	Improved quality of ecosystem services and reputation	Establishment of conservation forests; reforestation; establishment of ecological corridors; reintroduction of endangered species
Protection of water sources; management of water quality and supply	Reduced risk of potential water scarcity; improved reputation	Protection of water sources
Increased demand for renewable resources, including alternative uses for non-renewable resources; increased demand for certified products due to preference for nature-based products	Improved sales	Product development, acquisition of certifications, compliance with new regulations
Access to green funds and trading of forest carbon and biodiversity credits	Improved access to funding and financing	
Enhanced reputation through participation in initiatives, collaboration with stakeholders and community involvement	Improved reputation; increased opportunities for collaboration	Social contribution; communication with local communities

● Targets

Oji Holdings maintains and promotes measures to address identified risks and opportunities. In particular, targets have been set for reforestation, planting of native trees, and establishment of ecological corridors (Table 7). Oji Holdings decided to incorporate these targets into its KPIs for sustainability issues.

Table 7: Metrics and Targets

Metrics	Targets
Area of natural forest restored by CENIBRA on its land	At least 3,000 ha between 2024-2033
Number of native tree species planted by CENIBRA on its land	At least 500,000 seedlings between 2024-2033
Area of ecological corridors formed by CENIBRA outside its land*	At least 3,500 ha between 2024-2033

* The area fenced and protected to promote revegetation of degraded areas and movement of wildlife between fragmented natural forests. Ecological corridors are also referred to as "wildlife corridors" or "green corridors".