TECHNICAL STANDARD NO NET LOSS OF BIODIVERSITY

Contents

1. Introduction

Biological Diversity or Biodiversity is the variety and variability of life on Earth. Convention on Biological Diversity (CBD) defines Biodiversity as "the variability among organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; it includes diversity within species, between species and of ecosystems". Biodiversity supports the ecosystem functioning and provision of various goods and services, called as ecosystem services, fundamental for all human societies and economic activities.

Further, Mahindra Group was the founding of IBBI and has commitment for mainstreaming biodiversity value in businesses decision making. The objective of IBBI is to sensitize and mentor Indian business organizations for biodiversity conservation and enhancement.

2. Aim of Technical Standard

The technical standard aim is to provide guidance for meeting the Mahindra Auto And Farm Biodiversity Policy objective "Operate in Harmony with Nature by 2030" by implementing operation specific interventions.

3. Applicability of Technical Standard

This technical standard will be applicable to all the present operations under construction and future projects of Mahindra Auto And Farm. This standard will provide guidance to MAHINDRA AUTO AND FARM team in documenting, managing, and monitoring of biodiversity actions towards meeting Biodiversity Policy objective.

The site team will develop site specific action plan and monitoring mechanism to implement this technical standard and report back to corporate team for tracking over all progress of Biodiversity policy implementation.

4. Biodiversity and Ecosystem Services Risk Assessment

Biodiversity and Ecosystem Service risk assessment is critical for Businesses to develop the measurable action plan to address them in timely manner. The risk assessment on biodiversity and ecosystem for MAHINDRA AUTO AND FARM India operations based on the TNFD's revised risk and opportunity assessment approach (LEAP) V0.4.

LEAP approach is at the centre of the TNFD framework to support in the recognising that dependencies and impacts on biodiversity & Ecosystem services are location-specific and present risks and opportunities to organisations. Following two criteria's has been used for MAHINDRA AUTO AND FARM analysed the risk and Opportunities.

- Project located near areas of high ecosystem integrity and rapid decline in ecosystem integrity present greater risks than areas of low integrity
- Areas where an organisation has high dependencies and impacts on biodiversity and ecosystem services will present risks and opportunities to the organisation

Operations selected for Biodiversity risk and opportunity assessment:

Site Name	Division	District	States
AD Kandivali	Automotive division	Mumbai	Maharashtra
FD Kandivali	Farm division	Mumbai	Maharashtra
Nasik Plant 1	Automotive division	Nasik	Maharashtra
Nasik Plant 2 (T&D)	Automotive division	Nasik	Maharashtra
Igatpuri	Automotive division	Nasik	Maharashtra
Haridwar	Automotive division	Haridwar	Uttarakhand
Zaheerabad AD	Automotive division	Zaheerabad	Telangana
Zaheerabad FD	Farm division	Zaheerabad	Telangana
Nagpur	Farm division	Nagpur	Maharashtra
Rudrapur	Farm division	Rudrapur	Uttarakhand
FD jaipur	Farm division	Jaipur	Rajasthan
SBU-Jaipur	Spares Business Unit	Jaipur	Rajasthan
Swaraj Plant 1	Swaraj division	Mohali	Punjab
Swaraj Plant 2	Swaraj division	Mohali	Punjab
Swaraj Foundry	Swaraj division	Mohali	Punjab
SBU-Kanhe	Spares Business Unit	Lonavala, Pune	Maharashtra
MRV	Other Facilities	Chennai	Tamil Nadu
2 wheelers	Other Facilities	Pithampur, Dhar	Madhya Pradesh
Chakan		Pune	Maharashtra
MFG Plant		Bangalore	Karnataka

Risk for Mahindra Auto and Farm

Risk	Impact	Dependencies	Risk description	Location
Physical	Located near coastal areas so impacting coastal ecosystem	Dependency on lake for water recharge and flood control & dependency on greenbelt for air quality	Increased flooding due to changing rain season and increased cyclone intensity	MRV Chennai
	Sourcing of water resulting in impacting source biodiversity	Dependency on surface water (river, Lakes) and ground water	Increased cost due to water scarcity & operational challenges	All sites
		Dependency on greenbelt for enhanced biodiversity	Exotic and Invasive species growth, monoculture plantation & loss of biodiversity	All sites

Regulatory	Located near protected areas/ wildlife sanctuaries/ Wetlands		Located nearby protected areas/WLS etc (5 to 10 kms) may not allow expansion of projects	AD Kandivali, FD Kandivali, FD Nagpur, Haridwar
	Project located near Biodiversity Hotshots		May not allow expansion of projects	Igatpuri
		Dependency for air quality and dust control from greenbelt area	Increased cost for cleaning and not meeting regulatory standards Green should be 33% of total plat areas or as per state specific regulations	All Sites

Location wise Biodiversity risk assessment

Mahindra Auto and Farm India Operation	**Risk related to Biodiversity & Ecosystem Services**			
	Regulatory	**Physical**	**Transition/ Market**	**Financial**
AD Kandivali, Mumbai	Located at 6.6 km from Sanjay Gandhi National Park	Water availability as operation is dependent on groundwater and surface water, Flooding during monsoon	Expansion of facility may face challenges due to located within 10km radius of national park	• Increased compliance cost • Increased capital cost for new project
FD Kandivali, Mumbai	Located at 6.6 km from Sanjay Gandhi National Park	Water availability as operation is dependent on groundwater and surface water, Flooding during monsoon	Expansion of facility may face challenges due to located within 10km radius of national park	• Increased compliance cost • Increased capital cost for new project
Nashik Plant 1, Nashik	Not applicable	Water availability as operation is dependent on surface water (river), Management of Invasive and exotic species	Not applicable	• Increased restoration cost (plantation)
Nashik Plant (T&D), Nashik	Not applicable	Water availability as operation is dependent on surface water (river), Management of Invasive and exotic species	Not applicable	• Increased restoration cost (plantation)

Igatpuri, Nashik	Located at 1.2 km from Western Ghats	Water availability as operation is dependent on surface water (ponds), Water scarcity during summer season	Expansion of facility may face challenges due to located within 10km radius of national park	• Increased compliance cost • Increased capital cost for new project
Haridwar	Located at 2 km from Rajaji National Park	Water availability as Operation is dependent on ground water	Expansion of facility may face challenges due to located within 10km radius of national park	• Increased compliance cost • Increased capital cost for new project
Zaheerabad AD, Sangareddy	Not applicable	Operation is dependent on ground water	Not applicable	Increased water sourcing cost in future
Zaheerabad FD, Sangareddy	Not applicable	Operation is dependent on ground water	Not applicable	• Increased restoration cost (plantation)
Nagpur FD, Nagpur	Located at 3.8 km from Ambazari lake	Greenbelt management as it contains exotic species with monoculture	Expansion of facility may face challenges	• Increased compliance cost • Increased restoration cost (plantation with native species)
Rudrapur FD	Not applicable	Flooding during Monsoon, Operation is dependent on ground water	Not applicable	• Increased capital expenditure on infrastructure repair • Insurance costs • Clean-up costs • Increased cost due to interruption of operations and supply chain
FD Jaipur	Not applicable	Greenbelt management as it contains exotic	Not applicable	• Increased restoration cost (plantation

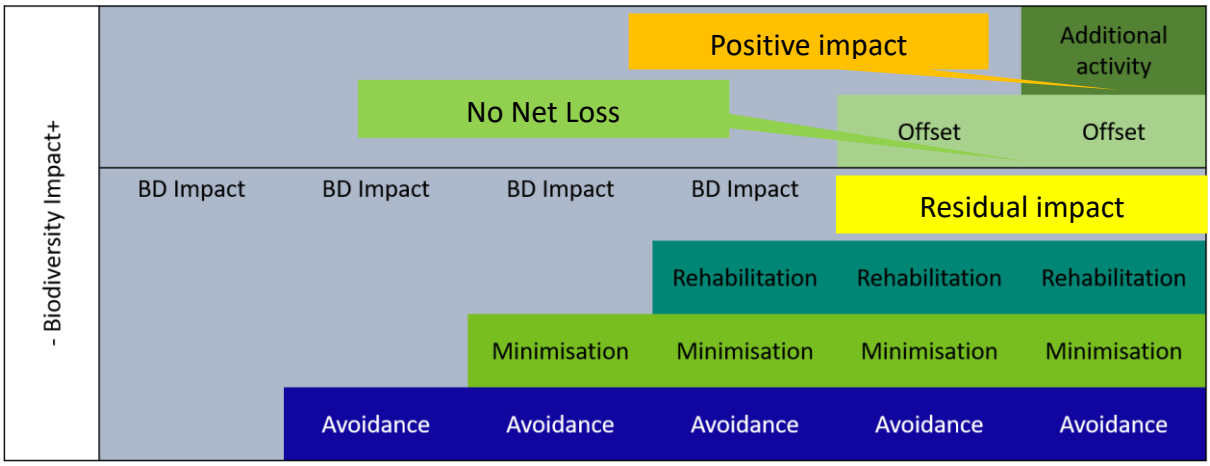
Swaraj Plant 1, Mohali	Not applicable	Management of greenbelt as it contains exotic species, Operation is dependent on ground water, Water scarcity (yellow zone)	Not applicable	• Increased compliance cost • Increased restoration cost (plantation
Swaraj Plant 2, Mohali	Not applicable	Management of greenbelt as it contains exotic species, Operation is dependent on ground water, Water scarcity (yellow zone)	Not applicable	• Increased compliance cost • Increased restoration cost (plantation) • Increased water sourcing cost
Swaraj Foundry, Mohali	Not applicable	Management of greenbelt as it contains exotic species	Not applicable	• Increased compliance cost • Increased restoration cost (plantation)
SBU Kanhe, Pune	Not applicable	Management of greenbelt	Not applicable	• Increased restoration cost (mixed plantation with native species)
SBU Jaipur	Not applicable	Management of greenbelt	Not applicable	• Increased restoration cost (mixed plantation with native species)
MRV, Chennai	Located near Kolavai lake 2km	Management of greenbelt. Operation is dependent on surface water, High Water scarcity during six months from Jan to June, Higher water requirement for irrigation of lawn and landscaping	Expansion of facility may face challenges due to presence of wetland ecosystem in close vicinity	• Increased compliance cost • Increased cost for water sourcing
TD Pithampur, Dhar	Not applicable	Management of greenbelt as it contains exotic species, Water scarcity	Not applicable	• Increased cost for water sourcing • Increased restoration

				cost (mixed plantation with native species)
Chakan, Pune	Not applicable	Management of greenbelt as it contains exotic species, Loss of biodiversity may occur due to future expansion plan (7 to 8 ha of natural vegetation to be affected)	Not applicable	• Increased restoration cost (mixed plantation with native species)
Bengaluru	Not applicable	Flooding events may occur during Monsoon as Bengaluru is becoming more prone to flooding events	Not applicable	• Increased capital expenditure on infrastructure repair • Insurance costs • Clean-up costs • Increased cost due to interruption of operations and supply chain

5. Achieving Operating in Harmony with Nature

MAHINDRA AUTO AND FARM has adopted the Biodiversity policy whin an objective to achieve Operating in Harmony with at all own operation in India. To achieve this commitment measuring the impacts and dependencies are critical to align the action areas implemented by each operations.

The concept of no net biodiversity loss lies at the heart of biodiversity offsetting. No net loss, in essence, refers to the point where biodiversity gains from targeted conservation activities match the losses of biodiversity due to the impacts of a specific development project, so that there is no net reduction overall in the type, amount and condition (or quality) of biodiversity over space and time. A net gain means that biodiversity gains exceed a specific set of losses.



This technical standard will follow the mitigation hierarchy (avoidance and minimization of impacts, followed by restoration/rehabilitation, and finally offsets) will optimize reduction of biodiversity impacts as per the IUCN No Net Loss approach as shown in above image[1 & 2].

Principle 1: Measuring Biodiversity Impact of Projects

Biodiversity impacts assessment is the primary stage to map the project impacts on the biodiversity and ecosystem services. Following are methodologies to map the impacts in operation and new projects.

- Mapping and description of habitats and terrestrial ecosystems within the project boundary and study area.
- Identification of flora and fauna along with rare and endangered species; nationally, regionally or locally significant species and communities present in the study area as per Wildlife Act, 1972 schedules[3]
- General description of aquatic ecosystems in study area including the source of water for the project.
- To ascertain the migratory routes of fauna, presence of breeding grounds and sensitive habitats in the study area.
- To assess the presence of protected areas in the study area, if any based on IBAT[4], DOPA[5] and Protected Areas documents[6]
- Mapping non-native or invasive species in operation

Floral Diversity: Nested quadrat sampling method for the study of community structure of vegetation. The sampling consists of randomly placed quadrats for trees, shrubs and herbs. The data on vegetation is quantitatively analyzed for abundance, density, frequency as per Curtis & McIntosh (1950). The Important Value Index (IVI) for trees is determined as the sum of relative density, relative frequency and relative dominance (Curtis, 1959).

Faunal Diversity: Transect method to evaluate the birds, reptiles, mammals and insect diversity in the project area. The sampling consists of randomly located transects of 100m length. The data is quantitatively analyzed for abundance, density, frequency as per Curtis & McIntosh (1950).

Species Diversity & Evenness Index

The species diversity index (H) for floral and faunal diversity is calculated by the use of Shannon Wiener Index (Shannon Wiener, 1963) as:

$$H = - \Sigma (ni/n) \times \ln (ni/n)$$

Where, ni is individual density of a species and n is total density of all the species

The Evenness Index (E) is calculated by using Shannon's Evenness formula (Magurran, 2004).

$$\text{Evenness Index (E)} = H / \ln(S)$$

Where, H is Shannon Wiener Diversity index; S is number of species

Ecosystem Services Impact Assessment

[1] https://www.iucn.org/content/no-net-loss-and-net-positive-impact-approaches-biodiversity
[2] https://ec.europa.eu/environment/nature/biodiversity/nnl/pdf/NNL_Glossary.pdf
[3] http://www.wiienvis.nic.in/Database/ScheduleSpeciesDatabase_7969.aspx
[4] https://www.ibat-alliance.org/
[5] https://dopa-explorer.jrc.ec.europa.eu/
[6] http://www.wiienvis.nic.in/Database/ConservationAreas_844.aspx

Business is not only affecting ecosystem services but also rely upon them. The level of impacts and dependencies vary from project to project based on the project modality. Identification of various ecosystems in project premises and analysis of varied ecosystem provided by them to operational locations is critical to implement their management plan for long term benefits.

Types of Ecosystem Services

Ecosystem services have been conventionally broken out or classified into four types:

Provisioning services	Regulating services	Cultural services	Supporting services
•Goods or products obtained from ecosystems, such as food, medicines, timber, fiber, and freshwater	•Benefits obtained from an ecosystem's control of natural processes, such as climate regulation, disease control, erosion prevention, water flow regulation, and protection from natural hazards	•Non-material benefits obtained from ecosystems, such as recreation, spiritual values, and aesthetic enjoyment	•Natural processes such as, soil formation, nutrient cycling, and primary productivity that maintain other services

The ESM methodology is a risk-based approach, where different ecosystem services (materials to general services) across its value chain will be mapped along with relevance as per cost to company to identify major interventions (based ISO 31000[7] principles).

ISO 31000:2009, Risk management – Principles and guidelines, provides principles, framework and a process for managing risk. It can be used by any organization regardless of its size, activity or sector.

Step 1

- Evaluate the company's activities and performance with regard to ecosystem and ecosystem services across its value chain (chosen on sample basis). Characterization of major Habitats around the project

Step 2

- Assesses the factory dependency on ecosystem services and impacts of its products and production location on the environment based on the IBBI ecosystem services matrix (ESM) methodology

The level of dependencies, impacts and management measures initiated for management of ecosystem services are analyzed based on the scale given in table.

Table : Scale for Dependency and Impacts

Dependency	Code	Definition
High Dependency	HD	Direct dependency on the B&ES with no alternative available
Medium Dependency	MD	Direct dependency on B&ES with short term alternative
Low Dependency	LD	Low direct dependency with many alternatives

[7] https://www.iso.org/iso-31000-risk-management.html

No Dependency	ND	Not dependent on B&ES for any project operation

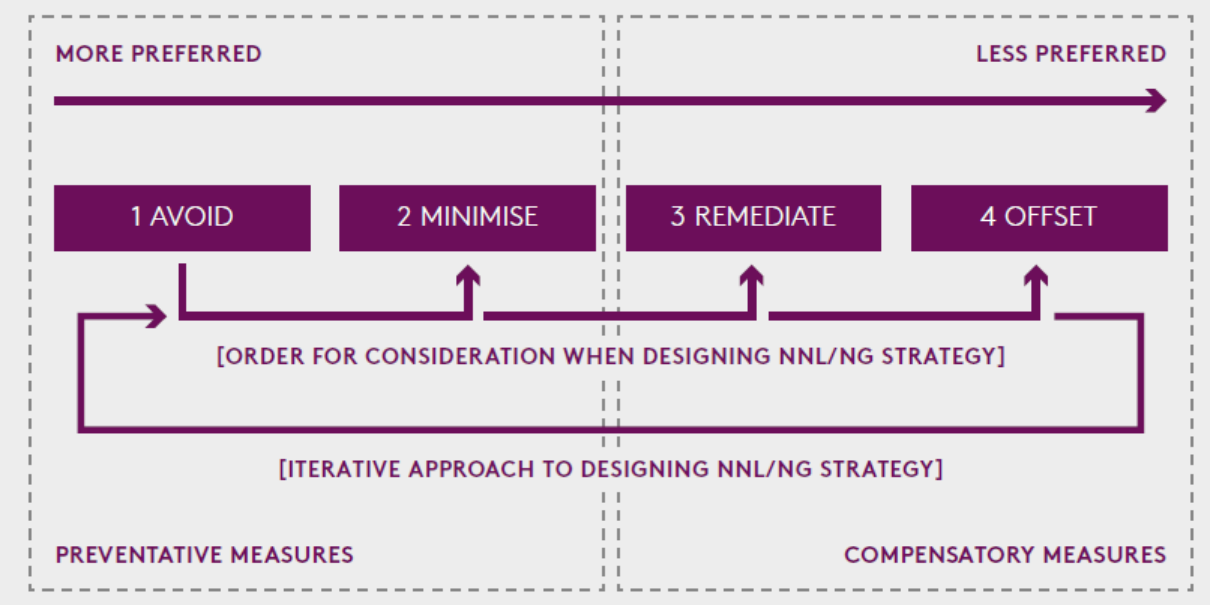
Impacts	**Code**	**Definition**
High Impact	HI	Project having direct impact on the B&ES and shall be minimized through management plan
Medium Impact	MI	Project having secondary impact on the B&ES and shall be minimized through management plan
Low Impact	LI	Project having tertiary impacts on B&ES
No Impact	NI	No impacts of project on B&ES

Principle 2: Avoidance and Minimisation of Biodiversity Impacts

Avoidance are the measures taken to avoid creating impacts from the outset (including direct, indirect and cumulative impacts), such as careful spatial or temporal placement of elements of infrastructure, in order to completely avoid impacts on certain components of biodiversity during the project design and construction phase.

Minimization are the measures taken to reduce the duration, intensity and / or extent of impacts (including direct, indirect and cumulative impacts, as appropriate) that cannot be completely avoided, as far as is practically feasible.

To achieve the No Net Loss/ Net Gain the avoidance and minimization steps are critical and most preferred which will minimize the project short-term and long-term impacts of the project[8]. The principles of achieving No Net Loss of biodiversity impacts should be applied as early as possible in the lifespan of a project, and concurrently with the design, implementation, maintenance, and monitoring of biodiversity achieving No Net Loss of biodiversity impacts.



[8] https://www.forest-trends.org/wp-content/uploads/2019/07/ensuring_no_net_loss_-_bull_et_al_2018.pdf

Following are the examples of avoidance and minimization measures in different phase of project implementation.

Planning Phase (includes avoidance)	**Construction Phase (includes avoidance and minimization)**	**Operation Phase**
Avoidance of operations near protected areas and Eco-sensitive zone of protected areas as per India's protected areas[9], IUCN protected areas categories I-IV, UNESCO World Heritage Sites and wetlands on the Ramsar Wetlands	Clustering project facilities on a single site to reduce the overall footprint. Using existing infrastructure wherever possible to *avoid* or reduce road construction and/or vegetation clearing. Identifying and protecting undisturbed site within project areas, for example to conserve patches or corridors of valuable habitat, or migration routes. Avoidance of road or rail transport at night, to facilitate freedom of movement for wildlife. Avoidance through scheduling involves changing the timing of construction activities to avoid disturbing species during sensitive periods of their lifecycle.	Manual and machine removal of grasses and weed from the project areas. Removal of weeds and grasses after the flowering and seeding season is over (Monsoon and start of winter). Avoidance of weed and grass removal during nesting season of birds and wildlife (June to September). Impose and enforce speed limits for vehicles to minimise chances of hits to wildlife Smoke and dust abatement can be significant in reducing impacts on wildlife and plants
Minimization of land use change for the project through planning infrastructure	Avoidance use of heavy machineries during morning (5 am to 9 am) and evening (4pm to 7pm) hours when birds, insects and reptile's movement is high.	Awareness creation of employees and workers for avoidance of snakes and birds nesting during management. Keep traffic to the minimum requirements to minimise risk to wildlife.
Integrating natural drainage system in the project design and avoidance of these areas during project planning phase.	Protecting native tress species in the acquired areas as per baseline assessment	Minimisation by taking steps to reduce levels of pollutants (e.g. emissions of dust, light, noise, gases or liquids) that could have negative impacts on BES.
Avoidance of migratory path areas of birds, wildlife and	Minimization by adapting the physical design of project infrastructure to reduce	Avoidance or Minimization of extraction of ground water.

[9] http://www.wiienvis.nic.in/Database/ConservationAreas_844.aspx

natural wetlands for land acquisition.	potential impacts, such as installing culverts on roads for natural drainage. Minimisation by managing and regulating the actions of people associated with the project— including staff, contractors and labourers, Minimisation by taking steps to reduce levels of pollutants (e.g. emissions of dust, light, noise, gases or liquids) that could have negative impacts on BES. Avoidance or minimization of ground water extraction and surface water use during construction phase	

Principle 3: Rehabilitation/ Restoration

Rehabilitation / restoration are the measures taken to rehabilitate degraded ecosystems or restore cleared ecosystems following exposure to impacts that cannot be completely avoided and/or minimized.

Following are the action shall be implemented for restoration of biodiversity or ecosystem services on which avoidance measures are not available and minimization measures is not possible.

Construction Phase	**Operation Phase**
Developing water harvesting structures to balance water requirement in construction phase	Developing landscape level interventions within project boundary to conserve water and regular maintenance of drainage system
Plantation of native tree in high noise and dust areas as a barrier	Revegetating temporary-use areas with native trees and shrubs as soon as any construction activities are complete. Plantation of native trees species in non-use areas which will not cause shade effect on solar panels. Using indigenous and non-invasive species for landscaping and rehabilitation works. Using soil, mulch and vegetation debris (that contain natural seed stock) to facilitate natural revegetation of disturbed areas, where reasonably practicable.
Separately retaining and storing topsoil and sub-soil stripped from the construction areas for later use during reinstatement	Developing Fireline to reduce fire incident during the dry sessions

	Restoration of wetlands based on Ramsar Wetland convention - Principles and guidelines for wetland restoration [10] to manage the Water requirements Construction of water harvesting structures such as ponds to lower the impact on biodiversity

Principle 4: Offsetting

Offsetting measures are taken to compensate for any residual significant, adverse impacts that cannot be avoided, minimized and / or rehabilitated or restored, to achieve no net loss of biodiversity. Offsets can take the form of positive management interventions such as restoration of degraded habitat, arrested degradation, or averted risk, protecting areas where there is imminent or projected loss of biodiversity.

Principles for offsetting[11]

1. Offsets must only occur after all previous steps in the mitigation hierarchy have been considered and no alternatives are available. Biodiversity offsets must never be used to circumvent responsibilities to avoid and minimise damage to biodiversity, or to justify projects that would otherwise not happen.
2. The mitigation hierarchy must be applied at the landscape or seascape level with mitigation actions designed and implemented at a site or project level.
3. In certain circumstances, residual impacts on biodiversity (after rigorous application of the mitigation hierarchy) are not offsetable, for example, where the risks are too high, or it is not possible to achieve sufficient gains for the target species or ecosystem elsewhere). Under these circumstances, biodiversity offsets are not appropriate, and this means the project as designed should not proceed.
4. The following need to be carefully considered when planning, designing and implementing biodiversity offsets
    a. Equivalence: is an offset a fair exchange for what is lost, either biodiversity that is ecologically similar or different but recognized by stakeholders as being of higher conservation value
    b. Additionality: will the offset lead to real biodiversity outcomes on the ground, which would not have resulted if not for the offset intervention?
    c. Long-term outcomes: is the offset designed, implemented and monitored to achieve clear, timebound and measurable outcomes for biodiversity?
    d. Longevity: will an offset last at least as long as a project's impacts (sometimes referred to as 'permanence')?
    e. Local stakeholder engagement: have the appropriate stakeholders been engaged in planning and design of the offset, and will they continue to be engaged in its implementation?

[10] https://www.ramsar.org/sites/default/files/documents/pdf/guide/guide-restoration.pdf

Operation Phase
Undertake afforestation activity in the nearby areas of project to restore natural forest, control of invasive species and addressing drives of biodiversity loss
Support local Forest office for protecting Rare, Endangered, Endemic and Threated Wildlife considering the criticality of the project and impacts on the specific species.
Restoration of wetlands based on Ramsar Wetland convention - Principles and guidelines for wetland restoration [12] in proximity of the projects and sourcing location of water.
Invest in implementation of Nature-based solution[13] over technological solution for addressing biodiversity impacts (Ex. sewage water treatment for villages to reduce pollution load in natural wetlands and rivers)

6. Biodiversity Management Plan

Biodiversity Management Plan is a site-specific document developed for a particular industry or developmental project and used by the site management team to maintain or improve biodiversity values in and around the project site during construction / operational phases of the project.

Setting objectives and targets for biodiversity management

- Long-term and short-term strategy for biodiversity conservation and natural resource conservation/ sustainable development/ environment management
- Describe the short-term (10 years) and long term (30 years – up to 2050) goals and targets, for No Net Loss or Net positive impacts/ change to biodiversity, established by the organization
- Share details of biodiversity aspects if addressed under goals and targets set for Natural Resource Conservation, Sustainable Development and Environmental Management.
- Share details of site-specific and global strategies (Short-term/ Long-term) planned and implemented to achieve the goals and targets that promote reduction of biodiversity impacts and accelerate activities that have a net positive impact on biodiversity

The process for developing a BMP should focus on baseline data generation, evaluating the probable impacts and preparing species specific management plan for conserving local biodiversity.

All the project areas should develop site specific BMP and should serve to:

- ❖ Regular monitoring of current biodiversity, Avoid or mitigate biodiversity loss, with the objective of maintaining the diversity of species, habitats and ecosystems in and around the project sites
- ❖ Contribute towards the remediation of significant global, regional and local biodiversity losses caused by expanding human economic activities worldwide
- ❖ For proposed project activity, critical habitat determination should have a more robust approach with a clearly documented output is to be adopted
- ❖ For high-risk project sites like which are nearer to migratory routes for different faunal groups / IBA (Important Bird Areas[14]) following issues may be highlighted as appropriate

[12] https://www.ramsar.org/sites/default/files/documents/pdf/guide/guide-restoration.pdf
[13] https://www.iucn.org/commissions/commission-ecosystem-management/our-work/nature-based-solutions
[14] Important Bird Areas (IBAs) in India (wiienvis.nic.in)

on the basis of baseline assessment and local needs as per the land cover of the study area

- Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value
- Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests
- Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration.

Key steps under mitigation hierarchy during different phases of projects										
Phases of projects	**Planning/prefeasibility**	**Feasibility study and EIA**	**Construction**		**Operation**			**Decommissioning**		
Stage of MH	Avoid	Minimise	Avoid	Minimise	Minimise	Restore	offset	Avoid	Minimise	Restore
Objective	Site selection and project designing that avoid impacts to areas with important biodiversity	Minimise impacts through micro-siting and operational controls	Undertaking activities to avoid impacts	Undertaking activities to minimise impacts	Minimising impacts through operational control	Return impacted areas to a natural/near natural state	Achieve NNL after addressing residual impacts	Undertaking activities to avoid impacts	Undertaking activities to minimise impacts	Return impacted areas to a natural state
Key Steps	1. Engage project planners and engineers with ecologists/ environment team 2. communication between project planners and environment team 3. Define study area and assess biodiversity risks involved and communicate to project planners in terms of delays in approval, high mitigation costs etc 4. Select site that avoid impacts	1. Assess risks and impacts that cannot be avoided 2. Develop minimisation methods to minimise impacts 3.	1. Identify areas with important biodiversity value such as natural vegetation patch, heritage trees, any water body supporting local biodiversity etc. 2. Avoid those areas if possible, during construction activities	1. Identifying minimisation actions under three categories i.e. physical, operational and abatement control	1. Identifying minimisation actions under three categories i.e., physical, operational and abatement control	1. Gather data on vegetation, habitat type and condition 2. Store topsoil for further use 3. undertake gradual and progressive restoration activity	Undertake Feasibility studies to select offset site(s) with similar habitats and species to the mine site, where conservation actions are technically, politically, and socially viable	1. Engage project planners and engineers with ecologists/ environment team 2. Scheduling: changing the timing of decommissioning activities to avoid impact on biodiversity	1. Abatement controls to reduce emissions and pollutants (e.g. noise, erosion, waste) created during decommissioning 2. Operational controls to manage and regulate staff/contractor activity.	Reinstatement of original vegetation, as far as feasible, following decommissioning

7. Monitoring of NNL Action Plan

Data can be collected on below indicators can be used for monitoring the action plan at sites and measuring the progress.

Monitoring and Measuring for NNL Approach

(Magnitude indicators' column represents the cost which have to be spent in the absence of mitigation of nature related risk mostly through nature based solutions)

Monitoring Parameters	Monitoring Indicators	Unit	Remarks	Magnitude Indicator when risks are not managed (not applicable to all Monitoring indicators)	Total cost incurred (INR)
Land use	Total land acquired for project	ha			Not Applicable
	Area of forest land/grass land/natural vegetation diverted for project	ha			Not Applicable
	Total Construction area	ha			Not Applicable
	Site near to High Biodiversity Area	Distance (km)	Project sites may face challenges during expansion	Cost of acquiring land for new project	
Greenbelt/ Afforestation	Total Greenbelt area	ha	33% of total land area		Not Applicable
	Trees per ha	trees/ha	It should be 2000 trees /ha	Cost of tree plantation/ha	Approx. Rs 3 lacs per hectare

	Total number of trees planted	Number of trees		Total Cost of tree plantation	Based on total area to be planted @Rs 3 lacs per hectare
	Number of native species	Number of species	Total Number of native species planted in greenbelt		Not Applicable
	Number of invasive species/ha	trees/ha	Number of invasive species in greenbelt		Not Applicable
	Removal of invasive species	Ha (area cleared) Number of species reduced	removal of invasive species from the greenbelt/project site Number of invasive species reduced	Cost of removal of invasive species per hectare	Aprrox. 1 Lacs per hectare
	Monoculture or Mix plantation	ha	Monoculture- Patches of same species Mix - Mix trees of more than 10 different native species	Cost of gap filling (with mix native species) per hectare to reduce the area under monoculture	Approx Rs 100 per plant sapling for gap filling
	Greenbelt patches are connected to each other	ha	Greenbelt in patches/ green belt connected through tree canopy/ continuous green cover		Not Applicable
Water	Total freshwater requirements	kl/year			Not Applicable
	Source of water		River/pond/ lakes/borewell/ supply by local authority		Not Applicable
	Total water discharge	kl/year	If any wastewater is discharged outside		Not Applicable

	Location of wastewater discharge		Discharge in River/pond/ Sea/lake etc		Not Applicable
	Water use reduction target	% of total consumption/year	Reduction in water use by the plant		Not Applicable
	Water harvesting structures	number	Number of water harvesting structures		Not Applicable
	Type of water harvesting structure		Underground/aboveground		Not Applicable
	Water storage capacity of harvesting structure	KL	storage capacity of water harvesting infrastructure	Cost saving due to less import/purchase of water from outside per day by using water from harvesting structures	days for which water is not purchased or sourced from outside
Wetlands	Number of wetlands restored	Number	Restoration Within premises and outside	Cost in restoring per hectare of wetland/waterbody (cost includes removing invasive species, desiltation, strengthening of embankments etc.)	Aprrox. Rs 50,000 per hectare
	Change in water storage after restoration	litres			Not Applicable
	Change in biodiversity after restoration (in terms of increased flora and fauna)	Increase in number of floral and faunal species	Record the change in flora and fauna diversity		Not Applicable
Air pollution	Major air pollutant of project				Not Applicable

	How greenbelt and buffer zone plantation are planned based on the air pollutants				Not Applicable
Noise Pollution	Traffic noise control	dB	Noise parameter to be measured regularly as high noise may impact wildlife		Not Applicable
	Noise dampening plantation around high noise generation areas		Details of plantation and species		Not Applicable
Dust Pollution	High dust emission areas		Number of areas at project site		Not Applicable
	Water sprinkling cycles/day	number			Not Applicable
	Water use for sprinkling	KL		Cost of water sprinkling for dust suppression per day. It includes cost of fuel used in tankers for sprinkling, cost of labour charges, cost of water (treated or recycled water)	To be discussed
	Measure implemented for dust emission control		details such as plantations or any other measures		Not Applicable
Carbon Sequestration	Carbon storage by trees in Greenbelt area	tCO2 eq/ha			Not Applicable
Natural Disasters	Incident of natural disaster in last five years	Number of events	Details about what type of disaster		Not Applicable

	Flooding	Number of flooding event in last five years	Provide dates and for how many days work at site is affected	Cost due to- 1. Repair of damaged infrastructure 2. Number of days operations are hampered 3. Number of employees not reaching to work 4. Supply chain disruption 5. Reduction in production of vehicles per day 6. Clean-up cost	To be discussed
	Droughts/water scarcity	Number of drought/water scarce event in last five years	Provide dates and for how many days work at site is affected	Cost due to- 1. Number of days operations are hampered 2. Cost of purchasing water from third party for operations 3. Cost of purchasing water for maintaining greenbelt/plantation/horticulture activity	To be discussed
	Cyclones	Number of cyclone event in last five years	Provide dates and for how many days work at site is affected	Cost due to- 1. repair of damaged infrastructure 2. Number of days operations are hampered 3. Number of employees not reaching to work 4. Supply chain disruption 5. Reduction in production of vehicles per day 6. Clean-up cost 7. Cost of removal of dead trees and planting new trees	To be discussed

8. Monitoring Progress Biodiversity Policy

Measurement of progress toward meeting the No Net Loss of Biodiversity and evaluating BMP is critical to identify corrective actions. Following is guideline to develop monitoring plan for achieving no Net Loss of Biodiversity at group level and site level.

Factors	Indicators guideline	Examples
Measurement	Choose from a wide range of possible metrics to generate proxy values for the relative biodiversity value of a place before and after the development and associated activities under the mitigation hierarchy.	- Species diversity - Habitat or Ecosystems - Ecosystem services - Species having high conservation values
Reference scenario	Evaluate against a defensible reference scenario. This may be a dynamic reference scenario (e.g. 'no development and no offset'), but in practice is very often a fixed baseline (which is a static reference scenario).	- Alternative analysis for project
Equivalence	In some cases, out-of-kind compensatory actions can be appropriate provided they entail 'trading up'.	- Going beyond project boundary for restoration - Identification of impact factors in catchment area of wetlands and then working on minimising the impacts.
Longevity	No Net Loss of Biodiversity impact should be achieved for at least as long as the associated development impacts that are being mitigated.	- Timeline of impacts short-term or long-term. - BAP should plan for at least 5 to 7 years
Time Lag	Time lags between impacts on biodiversity and the realisation of compensation measures should be limited as far as possible, with NNL/NG activities implemented before biodiversity loss from the development where possible. Technical solutions to help address time lags that do occur (e.g. multipliers) are available, but not always appropriate.	- Strat implementation of BAP along with start of project construction phase and continuation till 5 to 7 years of operation phase till the No Net Loss not achieved
Uncertainty	Incorporate consideration of relevant uncertainties	- Measurement of biodiversity losses and gains, ecological restoration outcomes and associated timescales
Reversibility	Biodiversity losses should be reversible in principle through remediation	
Thresholds	Certain biodiversity impacts cannot be offset to achieve No Net Loss	- Species extinction is an extreme example).
Additionality	Biodiversity No Net Loss activities, which are designed to deliver gains, achieve conservation outcomes that would not have occurred otherwise.	- Mapping positive changes in the areas in term of species and health of ecosystem services

Checklist for developing BMP to archive No Net Loss

Afforestation	
Do's	**Don'ts**
• Plantation of mix species • Greenbelt Development • Plantation of Native & Local Species • Plantation drive at Local or Community level • Plantation drive in Forest Areas or at Landscape Level • Use Mixed Gradient of Plants for Plantation (Herbs, Shrubs & Trees)	• Plantation of Monoculture • Use of Invasive Species • Land Clearing/Degradation • Clearing Natural Spaces / Diversion • Use of (inorganic/chemical) Pesticides or Fertilisers
Water Conservation	
Do's	**Don'ts**
• Rainwater Harvesting within Operations • Rainwater Harvesting at Community Level • Rooftop Water Harvesting • Treating & Recycling Sewage Water • Pond/ Lake Restoration • Wetland Restoration • Sustainable Irrigation for Horticulture or Farming Purposes • Sustainable Use of Water at Operational/Community/Urban/Society Level • Ground Water Recharge	• Water Run Off • Water Logging • Unsustainable or Unmonitored Irrigation • Degradation/ Diversion of Water bodies or Wetlands • Depletion of Ground Water • Overexploitation or Depletion of Natural Water Sources • Water Pollution • Wastewater Discharge into aquatic bodies
Species Protection & Conservation	
Do's	**Don'ts**
• Protection of RED Listed/ IUCN RET Species • Conservation of National Parks & Forest Areas • Collaboration with Local Authorities & Community • Monitoring of Key Important Species • Promoting Legal Trade • Sustainable Harvest of Wild Species • Conservation of Species of Value to Community • Sustainable Cultivation of Crop Varieties • Promoting Genetic/Local Crop Variety • Protection of Traditional or Medicinal Species • Promoting Natural Spaces & Habitats for Species Enhancement	• Unsustainable Trade or Harvest of Species • Degradation/Diversion/Land Clearing of Forest Areas • Destruction/Degradation/Diversion of Natural Habitats • Unsustainable Practices at Operations Level • Unsustainable Practices at Community Level • Pollution of Natural Resources (Water, Soil, Land, Air) • Plastic Waste Generation & Discharge

Ecosystem Service Management	
Do's	**Don'ts**
• Prevention & Control of Air Pollution • Control & Maintenance of Nosie Level • Prevention & Control of Water Pollution • Flood Control & Flood Plain Management • Restoring Green Cover at Community & Forest Level • Sustainable Management of Forest Commodities like Fuel Wood • Waste Segregation & Proper Disposal • Reuse, Recycle & Replace • Monitoring & Building Resilience for Extreme Weather Condition	• Overexploitation & Depletion of Natural Resources • Air & Water Pollution • Illegal Harvest of Forest Resources • Diversion of Natural Spaces due to Construction & Transport Activities • Destruction & diversion of Natural Habitats • Unsustainable Practices at Operational & Community Level • Waste Generation & Unmonitored Discharge • Destruction of Costal Habitat
Supply Chain Management	
Do's	**Don'ts**
• Addressing Nature & Biodiversity Aspects in Procurement Policy • Code of Conduct for Sustainable Supply Chain • Sustainable Consumption & Production • Promoting Biodiversity Friendly Practices • Use of Certified Raw Materials & Products • Developing Standards & Guidelines for Good Sector Specific Practices	• Procurement of Raw Materials from Unsustainable Source/Means • Maintaining Unsustainable Supply Chain • Violation of Supplier Code of Conduct • Violation of Standards or Guidelines

9. Knowledge and Awareness

Local, regional and national subject experts of different NGO's, Research organizations or Government agencies to be engaged for continuous biodiversity monitoring, Implementation of habitat Improvement measures, Public awareness programs and seminars/ workshops for field staff and other stakeholders.

Awareness Creation & Capacity Building	
Do's	**Don'ts**
• Awareness on Nature & Climate for Internal & External Stakeholders • Promoting Sustainable Use of Natural Resources at Operational & Community Level • Adopting Sustainable Agriculture Practices at Supply Chain & Community Level	• Sharing Information without Scientific Data • Use of Non-Certified Practices or Standards • Misinterpretation of Policy & Regulations • Non-Disclosure of Rules & Guidelines

• Addressing Socio, Economic & Environmental Challenges Linking to Nature & Climate • Education on Biodiversity Conservation & Climate Change Mitigation at School & University Level • Research Collaboration on Biodiversity & Ecosystem Services • Certification on Sustainable Practices at Operational & Community Level • Awareness on Science Base & Nature-based Targets • Development of Guidance Documents & Publications in Regional & Local Language • Knowledge Sharing on Nature & Climate Policy Aspects	

10. Reporting on No Net Loss of Biodiversity

Biological Diversity or Biodiversity is the variety and variability of life on Earth. The Convention on Biological Diversity defines Biodiversity as "the variability among organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; it includes diversity within species, between species and of ecosystems". Biodiversity supports the ecosystem functioning and provision of various goods and services, called as ecosystem services, fundamental for all human societies and economic activities.

All businesses are both affected by and rely upon Biodiversity and Ecosystem Services (B&ES) irrespective of their size, location and sector. They are directly or indirectly dependent upon the B&ES for goods and services as well as have impacts, either positive or negative through own operation or supply chain. Because of various activities across business value chain, there is reliance, disruption and degradation of biodiversity and ecosystems leading to severe impacts on the business operations and supply chain and expose businesses to significant risks[15].

[15] https://sustainabledevelopment.in/wp-content/uploads/2020/11/2020-IBBI-Guidance-Document-for-Bidoiversity-Disclosure.pdf

Definitions

Hotspots	Hotspots are areas of rich biodiversity like area with important/valuable plant species or area with high percent of active species spotted- like habitat of butterflies, birds or animals.
Protected Areas (PA)	Areas of natural, ecological and cultural values, recognized and dedicated for protecting and conserving biodiversity and ecosystems therein and are notified and legally protected by the government of India. Human occupation or exploitation of resources are limited within such areas.
National Parks	Areas reserved for conservation and preservation of natural environment and no human interference in any form is allowed.
Wildlife Sanctuary	Areas reserved for conservation of wildlife wherein certain human activities are allowed as long as they do not interfere with the well-being of animals.
Conservation Reserves and Community Reserves	Areas between established national parks, reserved and protected forests of India established by state governments after consultation with local communities which typically act as buffer zones, connectors and migration corridors.
Eco-sensitive Zones	Areas around protected areas created to prevent ecological damage caused due to developmental activities around protected areas and wildlife sanctuaries. Activities around such areas should be regulated and minimised to reduce negative impacts on fragile ecosystems encompassing the protected areas.
Ramsar Wetlands	Wetlands designated to be of international importance under the Ramsar Convention, for conservation and sustainable utilization of wetlands.
Rare, threatened and extinction (RET) species	Species listed under the IUCN Red list and under various schedules of Wildlife (Protection) Act, 1972, that are facing a significant risk and are vulnerable to extinction in the near future. These species are declining in number due to various threats such as habitat destruction, climate change, pollution or competition with aligning invasive species.
IUCN Red list	The International Union for Conservation of Nature Red List of Threatened Species, founded in 1964, is the world's most comprehensive inventory of the global conservation status of biological species. It uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies
Digital observatory on Protected Areas (DOPA)	The Digital Observatory for Protected Areas (DOPA) is a set of web services and applications that can be used primarily to assess, monitor, report and possibly forecast the state of and the pressure on protected areas at multiple scales.
World Database on Protected Areas (WDPA)	The World Database on Protected Areas is the largest assembly of data on the world's terrestrial and marine protected areas, containing more than 260,000 protected areas as of August 2020, with records covering 245 countries and territories throughout the world.
Internal Stakeholders	employees who are directly involved in the company’s internal operations. This includes employees from senior, middle and lower management.

Regulatory and Legal Risks	Changes in the regulatory regime at the national and international level leads to new policies and rules. These put pressure on businesses such as restricted access to land and resources, increased cost due to pricing and compensation regimes, subjected to litigations etc.
Environmental and Social Impact Assessment (ESIA)	Environmental and Social Impact Assessment (ESIA) is prepared to assess and predict potential adverse social and environmental impacts and to develop suitable mitigation measures, which are documented in an Environmental and Social Management Plan (ESMP)
Construction phase	Construction phase is a fundamental and challenging activity in the management and execution of construction projects. It involves the choice of technology, the definition of work tasks, the estimation of the required resources and durations for individual tasks, and the identification of any interactions among the different work tasks.
Operational Phase	The operational phase is that when the project started producing power
Land Use	The layout or arrangement of the uses of the land is known as “land use pattern”. The land may be used for agriculture, forest, pasture etc.
Migratory route	Migration route is a geographic route along which birds customarily migrate which is an established line of travel or access.