

7 Projected Net Environmental Impact (Post-mitigation)

7.1 Impact Identification and Assessment

This Chapter provides an assessment of net environmental impacts identified for the project following the application of recommended environmental prevention and mitigation measures. An assessment of environmental impacts pre-mitigation is provided in **Chapter 6**, while a description of recommended environmental prevention and mitigation measures is provided in **Chapter 7**.

Environmental prevention and mitigation measures identified in **Chapter 7** include Prevention, Mitigation, and Correction and Offsetting measures. In instances where Prevention measures are available, it is anticipated that the impact will be prevented, and the impact's importance will thus remain unchanged. In instances where Mitigation, Correction and Offsetting measures are available it is anticipated that the impact's importance will be decreased in the case of negative impacts and increased in the case of positive impacts.

Environmental resources are classified into three groups, namely abiotic, biotic and socioeconomic. The results of the criteria application are shown next.

7.2 Net discharges of airborne, liquid and solid wastes and resulting ambient impacts as compared to applicable host country, World Bank and other relevant regulatory standards and guidelines

Table 8.1: Assessment matrix for impacts on Abiotic Environment (Atmosphere)

<i>Impact</i>	<i>Project's stage</i>	<i>Work</i>	<i>Activity generating impact</i>	<i>Importance (Pre-mitigation)</i>	<i>Mitigation</i>	<i>Importance (Post-mitigation)</i>	
Change in air quality due to the emission of polluting gases and/or particulate matter	Construction	Construction – Housing program, forest activity	Transit of vehicles and machinery	-18	Specification MCA-01: Efficient use of water	-15	
		Internal roads	Location and layout	-18		Specification MCA-02: Waste water management	-15
	Operation	Adaptation and operation in cultivation areas	Land preparation and adaptation		-24	Specification MCA-03: Management of non-dangerous solid waste	-21
			Construction of firewalls		-18		-15
			Plantations		37		40
			Transport, management and storage of hazardous substances		-22		-19
			Transit of vehicles and machinery		-22		Specification MCA-04: Management

<i>Impact</i>	<i>Project's stage</i>	<i>Work</i>	<i>Activity generating impact</i>	<i>Importance (Pre-mitigation)</i>	<i>Mitigation</i>	<i>Importance (Post-mitigation)</i>
			Road maintenance	-21	of dangerous waste	-18
		Internal roads	Transit of vehicles and machinery	-28	Specification MCA-05:	-25
Emission of greenhouse gases	Construction	Construction – Housing program, forest activity	Transit of vehicles	-18	Preventing and controlling pollution by chemicals and fuels	-15
			Operation of machinery and equipment	-18		-15
		Internal roads	Transit of vehicles and machinery	-18		Specification MCA-06:
	Operation	Adaptation and operation in cultivation areas	Plantations	34	Management of atmospheric emissions and noise	37
			Waste management	-22		-19
			Transit of vehicles and machinery	-28		-25
Change in noise levels	Construction	Construction – Housing program, forest activity	Operation of machinery and equipment	-12	Specification MCA-07: Soil management	-12
			Internal roads	Transit of vehicles and machinery	-12	Specification MCA-08: Management and transportation of materials and equipment
	Operation	Adaptation and operation in cultivation areas	Transit of vehicles and machinery	-12	Specification MCA-09:	-12
Odor pollution	Operation	Adaptation and operation in cultivation areas	Waste management – composting process	-12	Dismantlement and abandonment program.	-12

Source: (Valoración Económica Ambiental, 2017)

Table 8.2: Assessment matrix of impacts for the Abiotic Environment (Soil)

<i>Impact</i>	<i>Project's stage</i>	<i>Work</i>	<i>Activity generating impact</i>	<i>Importance (Pre-mitigation)</i>	<i>Mitigation</i>	<i>Importance (Post-mitigation)</i>
Generation of erosive processes and instability	Construction	Construction – Housing program for forest activity	Location and reconsideration	-21	Specification MCA-01: Efficient use of water Specification MCA-02: Waste water management Specification MCA-03: Management of non-dangerous solid waste Specification MCA-04: Management of dangerous waste Specification MCA-05: Preventing and controlling pollution by chemicals and fuels	-19
		Internal roads	Location and layout	-21		-19
	Operation	Internal roads	Transit of vehicles and machinery	-15		-12
Change in soil's physical chemical properties	Construction	Construction – Housing program for forest activity	Foundation, masonry and finishes	-25	Specification MCA-06: Management of atmospheric emissions and noise Specification MCA-07: Soil management Specification MCA-08:	-22
	Operation	Adaptation and operation in plantations' areas	Land preparation and adaptation	-34		-31
			Fertilization	37		40
			Plague, disease and scrub control and management	-25		-22
			Transport, management and storage of hazardous substances	-25		-22
			Waste management	-25		-22
	Project's operation	Waste generation	-28	-25		
		Generation of domestic wastewater	-28	-25		
Generation of solid waste	Construction	Construction –Housing program for forest activity	Entire construction process	-12	Specification MCA-06: Management of atmospheric emissions and noise Specification MCA-07: Soil management Specification MCA-08:	-12
		Internal roads	Location and layout	-12		-12
	Operation	Adaptation and operation in plantations' areas	Land preparation and adaptation	-18		-15
			Fertilization	-34		-31
			Plague, disease and scrub control and management	-15		-12

Impact	Project's stage	Work	Activity generating impact	Importance (Pre-mitigation)	Mitigation	Importance (Post-mitigation)
			Trimming	-15	Management and transportation of materials and equipment Specification MCA-09: Dismantlement and abandonment program.	-12
			Waste generation	-34		-31
		Project's operation	Generation of domestic wastewater	-18		-15

Source: (Valoración Económica Ambiental, 2017)

Table 8.3: Impact assessment matrix for the Abiotic Environment (Water)

Impact	Project's stage	Work	Activity generating impact	Importance (Pre-mitigation)	Mitigation	Importance (Post-mitigation)
Changes In water availability	Construction	Construction – Housing program for forest activity	Entire construction process	-15	Specification MCA-01: Efficient use of water. Specification MCA-02: Waste water management.	-12
	Operation	Operation – nursery	Watering at nurseries	-33		-30
		Project's operation	Water consumption	-24		-21
Changes in water quality	Construction	Construction – Housing program for forest activity	Entire construction process	-12		-12
	Operation	Operation – nursery	Fertirrigation	-27		-22
		Adaptation and operation in plantations' areas	Fertilization	-30		-26
			Plague, disease and scrub control and management	-15	-12	
Project's operation	Generation of domestic wastewater	-33	-30			

Source: (Valoración Económica Ambiental, 2017)

Table 8.4: Impact assessment matrix for the Abiotic Environment (Landscape)

<i>Impact</i>	<i>Project's stage</i>	<i>Work</i>	<i>Activity generating impact</i>	<i>Importance (Pre-mitigation)</i>	<i>Mitigation</i>	<i>Importance (Post-mitigation)</i>
Landscape impact	Construction	Construction – Housing program for forest activity	Entire construction process	-21	Specification MCA-03: Management of non-dangerous solid waste.	-18
		Internal roads	Location and layout	-21		-18
	Operation	Adaptation and operation in plantations' areas	Plantations	-33	Specification MCA-04: Management of dangerous waste.	-30
		Project's operation	Waste generation	-21		-18
			Generation of domestic waste water	-21		Specification MCB-05: Forestry exploitation management.

Source: (Valoración Económica Ambiental, 2017)

7.3 Biological impacts (flora, fauna and related habitat)

Table 8.5: Impact assessment matrix for the Biotic Environment (Ecosystem)

<i>Impact</i>	<i>Project's stage</i>	<i>Work</i>	<i>Activity generating impact</i>	<i>Importance (Pre-mitigation)</i>	<i>Mitigation</i>	<i>Importance (Post-mitigation)</i>
Impact on land fauna and flora	Construction	Construction – Housing program for forest activity	Temporary adaptations	-18	Specification MCB-01: Fauna wildlife management	-15
			Transit of vehicles and machinery	-18		-15
		Internal roads	Location and layout	-21	Specification MCB-02: Flora wildlife management	-18
	Operation	Adaptation and operation in cultivation areas	Land preparation and adaptation	-36	Specification MCB-03: Integrated pest and disease management	-33
			Fertilization	-36		-33
			Transit of vehicles and machinery	-36	-33	
			Road maintenance	-36	-33	
Loss of vegetation	Operation	Adaptation and operation in cultivation areas	Land preparation and adaptation	-37		-34

<i>Impact</i>	<i>Project's stage</i>	<i>Work</i>	<i>Activity generating impact</i>	<i>Importance (Pre-mitigation)</i>	<i>Mitigation</i>	<i>Importance (Post-mitigation)</i>
					Specification MCB-04: Management of forest fires Specification MCB-05: Forestry exploitation management.	

Source: (Valoración Económica Ambiental, 2017)

7.4 Potential human impacts

Table 8.6: Impact assessment matrix for the Socioeconomic Environment (Economic)

<i>Impact</i>	<i>Project's stage</i>	<i>Work</i>	<i>Activity generating impact</i>	<i>Importance (Pre-mitigation)</i>	<i>Mitigation</i>	<i>Importance (Post-mitigation)</i>
Impact on properties (valuation)	Construction	Construction – Housing program for forest activity	Entire construction process	24	Specification MCSE- 01: Project personnel labor wellbeing specification	27
		Internal roads	Entire construction process	21		24
		Construction – Nursery	Entire construction process	21	Specification MCSE- 02: Specifications for managing socioeconomic and socio-environmental impacts caused by the project	24
	Operation	Operation – Nursery	Entire operational process	21	Specification MCSE- 03: Measures for dealing with	24
		Adaptation and operation in cultivation areas	Entire operational process	21		24
Demand for workforce and services	Construction	Construction – Housing plan for forest activity	Entire construction process	15		18

<i>Impact</i>	<i>Project's stage</i>	<i>Work</i>	<i>Activity generating impact</i>	<i>Importance (Pre-mitigation)</i>	<i>Mitigation</i>	<i>Importance (Post-mitigation)</i>
		Internal roads	Entire construction process	15	and resolving complaints	18
		Construction – Nursery	Entire construction process	15		18
	Operation	Operation – Nursery	Entire operational process	36		39
		Adaptation and operation in cultivation areas	Entire operational process	36		39
		Project's operation	Entire operational process	33		36

Source: (Valoración Económica Ambiental, 2017)

Table 8.7: Impact assessment matrix for the Socioeconomic Environment (Social)

<i>Impact</i>	<i>Project's stage</i>	<i>Work</i>	<i>Activity generating impact</i>	<i>Importance (Pre-mitigation)</i>	<i>Mitigation</i>	<i>Importance (Post-mitigation)</i>
Occupational accidents	Construction	Construction – Housing program for forest activity	Entire construction process	-15	Specification MCSE- 01: Project personnel labor wellbeing specification Specification MCSE- 02: Specifications for managing socioeconomic and socio-environmental impacts caused by the project	-12
		Internal roads	Entire construction process	-15		-12
		Construction – Nursery	Entire construction process	-15		-12
	Operation	Adaptation and operation in cultivation areas	Entire operational process	-15		-12
		Project's operation	Entire operational process	-15		-12

<i>Impact</i>	<i>Project's stage</i>	<i>Work</i>	<i>Activity generating impact</i>	<i>Importance (Pre-mitigation)</i>	<i>Mitigation</i>	<i>Importance (Post-mitigation)</i>
Training and skill building	Operation	Operation - Nursery	Entire operational process	12	Specification MCSE- 03: Measures for dealing with and resolving complaints	15
		Adaptation and operation in cultivation areas	Entire operational process	12		15
		Project's operation	Entire operational process	12		15
Job creation	Construction	Construction – Housing program for forest activity	Entire construction process	12		15
		Internal roads	Entire construction process	12		15
		Construction – Nursery	Entire construction process	12		15
	Operation	Operation – Nursery	Entire operational process	37	39	
		Adaptation and operation in cultivation areas	Entire operational process	37	39	
		Project's operation	Entire operational process	37	39	

Source: (Valoración Económica Ambiental, 2017)

7.5 Net exposures by workers to safety and health hazards

Table 8.8: Impact assessment matrix for Risk

<i>Impact</i>	<i>Project's stage</i>	<i>Work</i>	<i>Activity generating impact</i>	<i>Importance (Pre-mitigation)</i>	<i>Mitigation</i>	<i>Importance (Post-mitigation)</i>
Damages to machinery's and / or	Operation	Project's operation	Entire operational process	-12	Specification MCA-01:	-12

Impact	Project's stage	Work	Activity generating impact	Importance (Pre-mitigation)	Mitigation	Importance (Post-mitigation)
equipment's operation					Efficient use of water	
Fuel spills and / or chemical substances	Operation	Project's operation	Entire operational process	-33	Specification MCA-02:	-30
Threats of forest fires	Operation	Project's operation	Entire operational process	-49	Waste water management	-46
Sector's security	Operation	Project's operation	Entire operational process	-12	Specification	-12
High temperatures	Operation	Project's operation	Entire operational process	-37	MCA-03: Management	-34
Thunderstorms	Operation	Project's operation	Entire operational process	-12	of non-dangerous solid waste	-12
Flood threatens	Operation	Project's operation	Entire operational process	-33	Specification MCA-04: Management of dangerous waste Specification MCA-05: Preventing and controlling pollution by chemicals and fuels Specification MCA-06: Management of atmospheric emissions and noise Specification MCA-07: Soil management Specification MCA-08: Management and transportation	-30

<i>Impact</i>	<i>Project's stage</i>	<i>Work</i>	<i>Activity generating impact</i>	<i>Importance (Pre-mitigation)</i>	<i>Mitigation</i>	<i>Importance (Post-mitigation)</i>
					of materials and equipment Specification MCA-09: Dismantlement and abandonment program Specification MCB-01: Fauna wildlife management Specification MCB-02: Flora wildlife management Specification MCB-03: Integrated pest and disease management Specification MCB-04: Management of forest fires Specification MCB-05: Forestry exploitation management Specification MCSE- 01: Project personnel labor wellbeing specification	

<i>Impact</i>	<i>Project's stage</i>	<i>Work</i>	<i>Activity generating impact</i>	<i>Importance (Pre-mitigation)</i>	<i>Mitigation</i>	<i>Importance (Post-mitigation)</i>
					Specification MCSE- 02: Specifications for managing socioeconomic and socio-environmental impacts caused by the project Specification MCSE- 03: Measures for dealing with and resolving complaints	

Source: (Valoración Económica Ambiental, 2018)