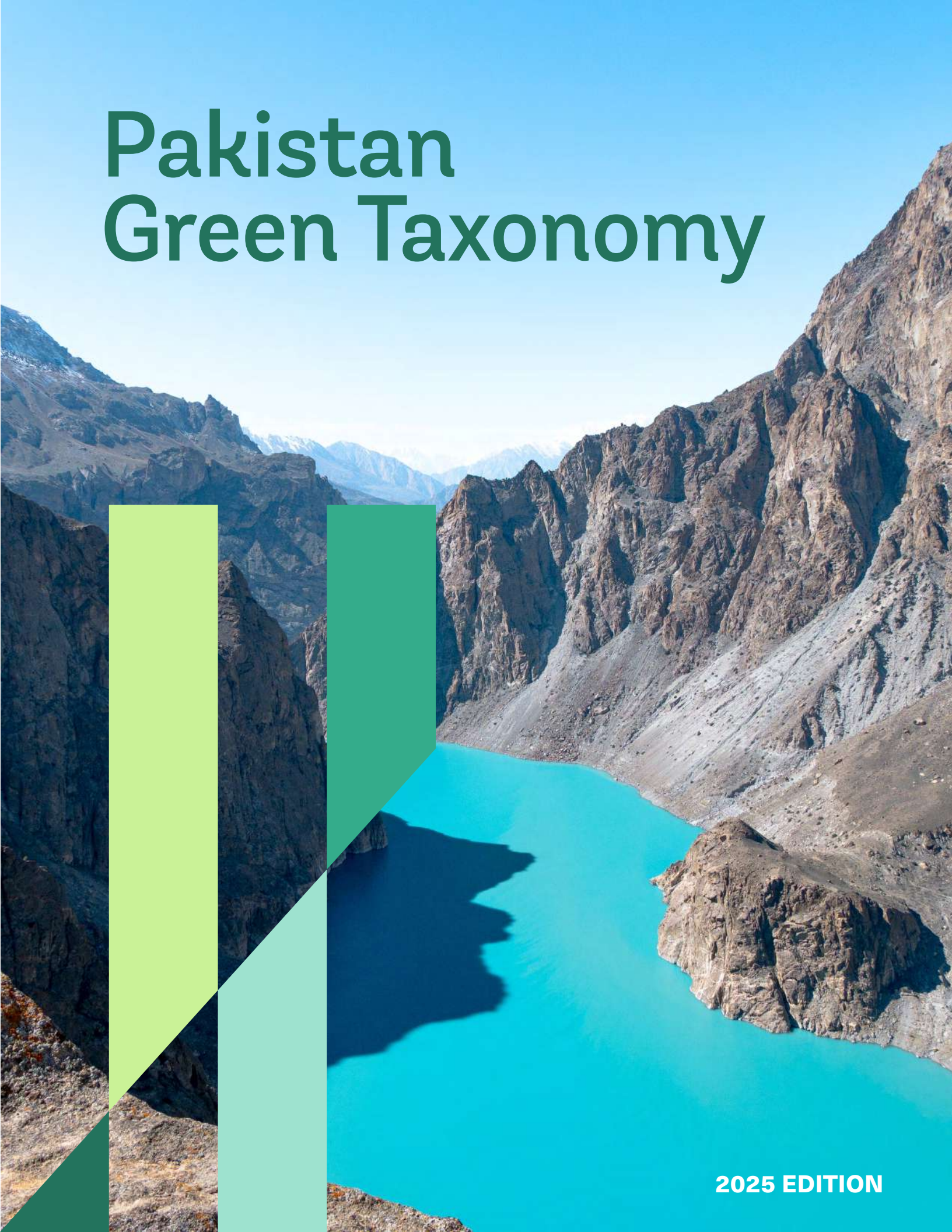
Pakistan Green Taxonomy



2025 EDITION

Disclaimer

The Pakistan Green Taxonomy has been developed as a classification system identifying green economic activities or investments in the country. It aims to facilitate market participants to identify and allocate capital to activities and projects that contribute towards climate change mitigation, adaptation, and other environmental objectives.

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Glossary

Adaptation (climate change)	Adjustments in ecological, social, or economic systems to address actual or expected climatic stimuli and their effects, including changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change [1]
Anaerobic digestion	Process through which anaerobic microorganisms break down organic matter (e.g., animal manure, wastewater biosolids, food wastes) in the absence of oxygen [2]
Baseline scenario	Benchmark against which performance and progress of a project can be compared and assessed [3]
Better Cotton Initiative	Non-profit, multistakeholder governance group that promotes better standards in cotton farming and practices across 22 countries [4]
Biochemical oxygen demand	Amount of oxygen that bacteria and other microorganisms consume while decomposing organic matter under aerobic (oxygen is present) conditions at a specified temperature [5]
Biodigester	Airtight systems (e.g., containers or tanks) in which naturally occurring microorganisms decompose organic material, diluted in water, generally after contaminants and moisture are removed [6]
Biofertiliser	(Also known as biological or organic fertiliser) fertiliser containing living organisms, based on phosphate solubilising, nitrogen fixing potassium, ferrous, sulphur, manganese solubilisers, and zinc-mobilising microbes in the market. Biodegradable and not chemically synthesised. [7]
Biofuel	Liquid fuels and blending components produced from biomass materials called feedstocks; may also include methane produced from landfill gas and biogas and hydrogen produced from renewable resources [8]
Biogas	Gas mixture with high methane content [9]
Biomethane	A near-pure source of methane produced by “upgrading” biogas (a process that removes any carbon dioxide or other contaminants present in the biogas) or gasifying solid biomass followed by methanation [10]
Biozote	Refers to a type of product used primarily in agriculture. It is a biocontrol agent made from beneficial microorganisms that help with pest control and disease prevention in crops. Biozote is often used as a natural, eco-friendly alternative to chemical pesticides, promoting healthier soil and plant growth. This type of product is developed by the National Agricultural Research Centre in Pakistan [11]
Carbon intensity	Amount of carbon dioxide emissions released per unit of another variable, such as gross domestic product, final energy use or transport [12]
Carbon sink	Forest or other ecosystem that absorbs carbon dioxide, removing it from the atmosphere and offsetting carbon dioxide emissions [13]

Circular economy	A model of production and consumption that involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible [14]
Climate change	Climate transformation attributed to human activity that directly or indirectly alters the composition of the global atmosphere in addition to natural variability observed during comparable periods [15] can be identified (e.g., by statistical tests) according to changes that persist over long periods of time (decades or longer) in the mean value of climate properties or the variability of these properties [16]
Climate Risks	Climate risks are categorized into physical risks and transition risks. Physical Climate Risks arise from climate-related hazards that impact assets, infrastructure, and operations. Transition Climate Risks result from policy, market, and technological shifts toward a low-carbon economy.
Climate-smart agriculture	An approach that uses green and climate resilient practices in agriculture; helps reach internationally agreed goals such as the Sustainable Development Goals and the Paris Agreement sustainably increasing agricultural productivity and incomes, adapting and building resilience to climate change, and reducing or removing greenhouse gas emissions [17]
Composting	A biological process that subjects biodegradable waste to anaerobic or aerobic decomposition, resulting in a product used in soil or for producing substrates or growing media [18]
Cross-docking	A logistics and supply chain strategy where inbound goods are transferred directly from incoming trucks or railcars to outbound vehicles with minimal storage time
Decarbonization	Removal of carbon dioxide from or reduction of its release into the atmosphere by switching to use of low-carbon energy sources [19]
Deforestation	Removal of trees from land and its conversion to non-forest use [20]
Digestate	A valuable residue generated as a by-product of anaerobic digestion, characterized by its nutrient-rich composition, which includes a balanced mixture of macro- and micronutrients essential for plant growth [21]
Environmental management plan	Description of how a project or activity might affect the natural environment in which it occurs and a list of clear commitments and actions on how those impacts will be avoided, Minimised, and managed so that they are environmentally acceptable [22]
Forest management plan	Planning and implementing practices for stewardship and use of forests and other wooded land with environmental, economic, social, and cultural objectives [23]
Fossil fuel	Carbon-based fuel from fossil carbon deposits, including oil, natural gas and coal [24]
Fossil fuel blends	Refer to fuels that are a mixture of fossil fuels and other energy sources, such as biofuels or synthetic fuels, often used as a transitional step toward decarbonization.
Global warming	Estimated 30-year, or 30-year average global mean surface temperature increase expressed relative to pre-industrial levels, unless otherwise specified [25]

Greenhouse gas	Natural and anthropogenic gaseous constituents of the atmosphere that absorb and re-emit infrared radiation, including carbon dioxide, methane, nitrogen oxides, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride [16]
Greenwashing	A type of advertising that intentionally or unintentionally attributes false environmentally positive qualities to a service or product [26]
Green Taxonomy	Classification system for identifying activities or investments that will move a country toward specific targets related to priority environmental objectives
Mitigation (climate change)	Efforts to reduce or prevent greenhouse gas emissions in order to limit the extent of climate change by addressing its root causes through decreasing emission sources or increasing the capacity of natural and artificial sinks that absorb greenhouse gases
Nationally determined contribution	A country's national climate action plan under the Paris Agreement that outlines how it plans to reduce greenhouse gas emissions to meet Paris Agreement goals and adapt to the impacts of climate change [27]
Net zero	A state wherein the amount of greenhouse gas emissions removed from the atmosphere balances the amount emitted [28]
Non-hazardous waste	Waste materials that do not pose direct risks to human health or the environment, such as paper, plastics, organic waste, glass, and metals.
Notre Dame-Global Adaptation Index	Measures a country's vulnerability to climate change and assesses its readiness to leverage private and public sector investment for adaptive actions [29]
Organic fertiliser	Material of animal origin used to maintain or improve plant nutrition and physical and chemical properties and biological activity of soils, separately or together (e.g., manure, digestive tract content, compost, digestion residues) [30]
Perennial crop	Crops typically considered more permanent, requiring several growth cycles before fruit is produced [31]
Product carbon footprint	Total greenhouse gas emissions created during a product's life cycle from raw material extraction through pre-processing, manufacturing, distribution, use and disposal. Typically measured in carbon dioxide equivalents, which allows different types of greenhouse gases to be compared on a common basis [32]
Ramsar site	A site listed on the List of Wetlands of International Importance, also known as the Ramsar List, that meets the criteria for identifying wetlands of international importance [33]
Regenerative agriculture	A transformational method of agriculture that restores and enhances ecosystem health while maintaining food production, rebuilding ecological systems, enhancing soil fertilization, and providing resilience against climate change [34]
Run-of-the-river hydropower	Run-of-the-river hydroelectric plants manipulate flow of water and elevation drop of streams to generate power. Run-of-river projects are classified into two types; low head and high head. Low head projects are usually suitable for large rivers that have gentle gradients, whereas the high head types are more appropriate for small rivers having steep gradients [35]

Substantial contribution criteria	Activities and economic assets that, by meeting established substantial contribution criteria, support the achievement of environmental objectives defined in the Taxonomy
Soil degradation	Change in the soil health status that decreases the capacity of the ecosystem to provide goods and services for its beneficiaries
Sustainable development	Development that leads to economic growth, good quality of life and social well-being without depleting the renewable natural resource base, damaging the environment or limiting the right of future generations to use the environment to meet their own needs [36]
Sustainable urban drainage system	An environmentally beneficial drainage system that causes minimal or no long-term damage, often organized as a sequence of management practices, control structures and strategies to drain surface water efficiently and sustainably while minimizing pollution and managing the impact on the quality of local water bodies [37]
Upflow anaerobic sludge blanket digestion	An anaerobic digester used in wastewater treatment that produces methane and forms a blanket of granular sludge that the anaerobic microorganisms processed [38]
Volatile organic compounds	Compounds with high vapor pressure and low water solubility; often human-made chemicals used and produced in the manufacture of paints, pharmaceuticals, and refrigerants, typically, industrial solvents, fuel oxygenates, or by-products produced by chlorination in water treatment, such as chloroform, common ground-water contaminants [39]
Water stress	Demand for water that is greater than the amount available during a given period [40]

Acronyms and Abbreviations

AD	Anaerobic digestion
AFOLU	Agriculture, Forestry, and Other Land Uses
ANSI	American National Standards Institute
ASEAN	Association of Southeast Asian Nations
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ATES	Aquifer thermal energy storage
BAP	Best Aquaculture practices
BCI	Better Cotton Initiative
bio-CNG	Bio-Compressed Natural Gas
BMS	Building Management Systems
BOD	Biochemical oxygen demand
CAES	Compressed-air energy storage
CAPEX	Capital expenditure
CARL	Current Annual Real Losses
CBI	Climate Bonds Initiative
CCGT	Combined cycle gas turbine
CCUS	Carbon capture, utilisation, and storage
CII	Carbon Intensity Indicator
CO_2	Carbon dioxide
CPI	Climate Policy Initiative
CSA	Climate smart agriculture
CSP	Concentrated solar power
CTM	Coal Transition Mechanism
DNSH	Do no significant harm
EAF	Electric Arc Furnace
ECBC	Energy Conservation Building Code
EDGE	Excellence in Design for Greater Efficiencies
EEDI	Energy Efficiency Index
EEXI	Energy Efficiency Existing Ship Index
EHS	Environmental, Health, and Safety
ELECTRE	Elimination and Choice Translating Reality
EPA	Environmental Protection Agency
EPC	Energy Performance Certificate
ESCO	Energy service company
ESG	Environmental, social, and governance
ETP	Endangered, Threatened, or Protected

EU	European Union
EU RED	European Union Renewable Energy Directive
EV	Electric Vehicle
FCBTK	Fixed Chimney Bull's Trench Kiln
FRP	Floods Response Plan
FSC	Forest Stewardship Council
GDP	Gross domestic product
GHG	Greenhouse Gas
Global GAP	Global Good Agricultural Practices
GOT	Global Organic Textile
GWP	Global Warming Potential
HC	Hydrocarbons
HCS	High-carbon stock
HEIS	High Efficiency Irrigation System
HQE	High Environmental Quality
HVAC	Heating, ventilation, and air conditioning
IAPP	International Air Pollution Prevention
ICAO	International Civil Aviation Organization
ICMA	International Capital Market Association
ICT	Information and communications technology
IEA	International Energy Agency
IESNA	Illuminating Engineering Society of North America
IFC	International Finance Corporation
IFM	Integrated Farm Management
IFOAM	International Federation of Organic Agriculture Movements
ILI	Infrastructure Leakage Index
IMO	International Maritime Organization
IMTA	Integrated Multi-Trophic Aquaculture
IPCC	Intergovernmental Panel on Climate Change
ISCC	International Sustainability and Carbon Certification
ISIC	International Standard Industrial Classification of All Economic Activities
ISO	International Standards Organization
IT	Information technology
ITDP	Institute for Transportation and Development Policy
IUCN	International Union for Conservation of Nature
IWQGES	International Water Quality Guidelines for Ecosystems
LCE	Life Cycle Emissions
LED	Light-emitting diode
LEED	Leadership in Energy and Environmental Design
MARPOL	International Convention for the Prevention of Pollution from Ships

MDBs	Multilateral Development Banks
Micro-CHP	Combined Heat and Power (Micro scale)
MSW	Municipal Solid waste
NBSAP	National Biodiversity Strategy and Action Plan
NCCP	National Climate Change Policy
NDC	Nationally Determined Contribution 2021
ND-GAIN	Notre Dame-Global Adaptation Index
NEECA	National Energy Efficiency and Conservation Authority
NEP	National Electricity Policy
NEQS	National Environmental Quality Standards
NMHC	Non-methane hydrocarbons
NWP	National Water Policy
OECD	Organisation for Economic Co-operation and Development
Op	Opacity
PA	Paris Agreement
PAHs	Polycyclic aromatic hydrocarbons
PCF	Product Carbon Footprint
PCRWR	Pakistan Council of research in water resources
PEFC	Programme for the Endorsement of Forest Certification
PEPA	Pakistan Environmental Protection Act
PGP	Power Generation Policy
PGT	Pakistan Green Taxonomy
PIEVC	Public Infrastructure Engineering Vulnerability Committee
PM	Particulate matter
PNAP	Pakistan National Adaptation Plan
POIG	Palm Oil Innovation Group
PSIC	Pakistan Standard Industrial Classification
PV	Photovoltaic
REDD+	Reduced Emissions from Deforestation and Forest Degradation
RSB	Roundtable on Sustainable Biomaterials
SAF	Sustainable aviation fuel
SAICM	Strategic Approach to International Chemicals Management
SEEMP	Ship Energy Efficiency Management Plan
SIR	State of Industry Report
SLCPs	Short-lived climate pollutants
Smartcane BMP	Smartcane Best Management Practice program
SPL	Spent Pot Lining
SPN	Sustainable Poultry Network
SRP	Sustainable Rice Platform
SSPI	Intensive silvopastoral systems

SUDS	Sustainable drainage system
TCO_2e	Tonnes of carbon dioxide equivalent
TNA	Technology Needs Assessment Report
TRI	The Restoration Initiative
UARL	Unavoidable Annual Real Losses
UASB	Upflow anaerobic sludge blanket digestion
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UTES	Underground Thermal Energy Storage
WEEE	Waste Electrical and Electronic Equipment
WHO	World Health Organization
WMO	World Metrological Organization
WWF	World Wildlife Fund

Executive Summary

A green taxonomy is a classification system for identifying activities or investments that will move a country toward meeting specific targets related to priority environmental objectives. Pakistan's commitment to sustainable development and climate resilience necessitated the development of a green taxonomy that provides clear and science-based definitions of economic activities to increase capital flows into sectors that are critical for achieving its climate and environmental goals.

Objective. The Pakistan Green Taxonomy (PGT) is intended to provide clarity to financial market participants on how to identify green economic activities, increase the transparency of green investments and financial products, mitigate climate-related financial risks, and help the financial sector direct capital flows to projects or activities that will meet the country's environmental and climate objectives.

The PGT project. The State Bank of Pakistan (SBP) initiated the project in January 2024. The development process adhered to the recommendations outlined in the World Bank report "Developing a National Green Taxonomy" [41]. The Taxonomy is being developed in phases, with the 2025 edition focusing on substantial contribution to the objectives of climate change mitigation and adaptation.

Interoperable but locally relevant. The Taxonomy was developed based on a benchmarking exercise involving several globally recognised taxonomies to ensure interoperability while taking into account the national context. Local experts evaluated metrics, thresholds, local availability, technology readiness, and affordability to ensure that the Taxonomy accurately reflects the local context. Where necessary, international criteria were adapted to the local context without compromising scientific rigor and credibility.

Dynamic. The PGT is a dynamic document, anticipated to undergo periodic revisions to update the criteria in response to changes in environmental priorities and goals, the cost and availability of new technologies, and the necessity to incorporate additional sectors, activities, and environmental objectives.

Environmental objectives. The environmental objectives identified in the Taxonomy are:

- Climate change mitigation
- Climate change adaptation
- Sustainable use and protection of water resources
- Protection of healthy ecosystems and biodiversity
- Pollution prevention and control
- Promotion of circular economy
- Sustainable land management

The 2025 edition of the Taxonomy identifies economic activities that contribute substantially to climate change mitigation and adaptation while avoiding significant harm to the other environmental objectives and maintaining minimum social safeguards. A separate approach was adopted for the agriculture (including livestock), forestry, fishing and aquaculture, and Tourism sectors, where identified activities support not just climate change mitigation and adaptation objectives, but also the sustainable use and protection of water resources, and protection of healthy ecosystems and biodiversity, etc.

Substantial contribution means that an economic activity makes a meaningful and measurable contribution to stated environmental goals. For an activity to qualify as being environmentally sustainable, it must contribute substantially to climate change mitigation or adaptation while also complying with Do No Significant Harm (DNSH) criteria and minimum social safeguards (MSS).

Sectors covered. This edition of the PGT covers six (6) sectors that have substantial contribution to the climate change mitigation objective, specifically the reduction of greenhouse gas (GHG) emissions, and eight (8) sectors that directly improve adaptation to climate change. Furthermore, the tourism and agriculture (including livestock), forestry, fishing and aquaculture sectors incorporate activities and measures that contribute simultaneously to multiple environmental objectives.

Sectors that contribute substantially to climate change mitigation were identified based on analyses of priority sectors in Pakistan's climate strategies and policies as well as sector coverage in other taxonomies. This evaluation was supplemented with a quantitative analysis of the economic significance of each sector utilizing metrics such as gross domestic product (GDP) and GHG emissions. The sectors identified as most pertinent for climate change mitigation are manufacturing, transport, energy, construction, waste and water, information and communications technology (ICT), tourism, agriculture (including livestock), forestry, fishing and aquaculture.

The sectors pertinent for climate change adaptation were identified through a comprehensive review of key national policies on climate change adaptation, the sector coverage in existing taxonomies and the Notre Dame Global Adaptation Initiative's (ND-GAIN) Country Index for Pakistan.[1] Based on this analysis, the sectors of water, disaster risk management, and urban resilience—including transport, ICT, construction, manufacturing, waste, energy— were prioritised. The climate change adaptation objective includes both adapted and enabling activities and measures.

The agriculture (including livestock), forestry, fishing and aquaculture sectors contribute significantly to multiple environmental objectives simultaneously, including climate change mitigation and adaptation. A practice-based approach was employed for these sectors, facilitating a transition from basic to advanced practices over time. Transitional and ineligible practices were also identified to achieve a gradual shift toward sustainable, resilient systems. In the tourism sector, a practice-based approach was employed to identify targeted investments aimed at addressing a range of environmental objectives, particularly in response to the sector´s significant environmental impacts, such as greenhouse gas emissions, resource overconsumption, and ecosystem degradation.

Activities covered: The PGT identifies 55 activities for the climate change mitigation objective and 101 practices in the agriculture (including livestock), forestry, fishing and aquaculture. A traffic light system is utilized to classify substantial contribution criteria into green, amber (transition) and red (ineligible) categories. Additionally, 77 activities or measures for climate change adaptation were identified, along with seven green investment categories for the Tourism sector. All economic activities contribute to various environmental objectives.

To determine the comprehensive range of activities in the PGT, the following approaches were employed: i) the use of classification systems, with the Pakistan Standard Classification of Economic Activities (PSIC) and the International Standard Classification of International Activities (ISIC) serving as references; and ii) the examination of different taxonomies. Additional activities deemed significant to the country but not included in other taxonomies were incorporated following consultation with stakeholders.

1 This index calculates a country's vulnerability to climate disruptions and assesses its readiness to leverage private and public sector investment for adaptive action.

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Working Group

- State Bank of Pakistan
- Ministry of Climate Change
- Ministry of Finance and Revenue
- Ministry of Planning Development and Special Initiatives
- Securities Exchange Commission of Pakistan
- Pakistan Stock Exchange
- National Energy Efficiency and Conservation Authority
- National Electric Power Regulatory Authority
- Private Power and Infrastructure Board)
- Environmental Protection Department, Punjab
- Sindh Environmental Protection Agency
- Environmental Protection Agency, Khyber Pakhtunkhwa
- Environmental Protection Agency, Balochistan
- Environmental Protection Agency, Azad Jammu and Kashmir
- Environmental Protection Agency, Gilgit Baltistan
- Pakistan Bankers Association
- Federal Board of Revenue
- Board of Investment

Technical Experts

- Ministry of Communications
- Ministry of Information Technology and Telecommunications
- Ministry of Maritime Affairs
- National Disaster Management Authority
- Pakistan Tourism Development Corporation
- Ministry of Energy (Power Division)
- Ministry of Housing and Works
- Ministry of Industries and Production
- Ministry of Commerce
- Pakistan Council of Research in Water Resources
- National Disaster Management Fund
- Global Climate Change Impact Studies Centre
- Pakistan Agricultural Research Council

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Introduction

Background

Climate change has profound impacts on nature, people and the global economy. According to the World Metrological Organisation, Asia, the world's most populous continent, is experiencing warming at a rate faster than the global average [42]. Similar to other developing nations in Asia, Pakistan is confronting substantial climate change challenges, including climatic variability, which is diminishing water availability and resulting in more severe, more frequent, and prolonged droughts, as well as extreme weather events such as floods.

Climate action is, therefore, a priority for the government and people of Pakistan [43]. The country's updated 2021 Nationally Determined Contributions (NDCs) signify a paradigm shift toward an inclusive, innovative, whole-of-economy approach to addressing climate change challenges through targeted adaptation and mitigation actions. Ranked second worst of all countries in 2023 in terms of Air Quality Index, with an average concentration of particulate matter (PM2.5) that was 14.7 times greater than the World Health Organization´s annual air quality guideline, Pakistan has initiated various programmes aimed at controlling emissions from industry, vehicles, and other sources [44].

The revised NDCs set forth an unconditional emissions reduction target of 15 percent and a conditional target of 35 percent from baseline by 2030. Additionally, the revised NDCs commit to increasing protected area land coverage from 12 to 15 percent, transitioning the energy mix toward 60 percent renewable and alternative energy, and increasing the number of electric vehicles by 30 percent by 2030.

The transformation of Pakistan into a sustainable economy necessitates balancing social, economic, and environmental needs and requires significant investment. In 2021, approximately US$4 billion in public and private capital was invested in climate mitigation and adaptation activities in Pakistan, with international entities such as multilateral development banks, multilateral funds, and private investments contributing 84 percent of this amount [45]. The World Bank estimates that the total investment required for a comprehensive response to Pakistan's climate challenges between 2023 and 2030 is approximately US$348 billion, which represents 10.7 percent of cumulative GDP for the same period. This includes US$152 billion (44 percent) for supporting adaptation and resilience and US$196 billion (56 percent) for decarbonization and mitigation [43].

In November 2024, Pakistan unveiled its inaugural National Climate Finance Strategy, marking a significant milestone in the country's efforts to address its climate vulnerabilities. The strategy aims to mobilise $348 billion to close the climate finance gap by 2030. It sets ambitious targets for emission reductions, aiming for a 50 percent decrease by 2030, with 15 percent achieved through domestic efforts and an additional 35 percent contingent on international support [46]

In Pakistan, the energy and the agricultural, forestry, and other land use sectors possess the greatest mitigation potential. Interventions to support adaptation and resilience must also be prioritised, particularly to address climate risks to critical systems such as water and food security, infrastructure and the built environment, industry, and biodiversity.

The PGT delineates green and transitional[2] activities utilizing criteria that are science-based and interoperable[3] with other globally recognized taxonomies. Science-based means that it is based on rigorous scientific evidence and established national and/or global environmental targets. To be interoperable the design elements of the Taxonomy must be consistent with best practices, thereby facilitating the accelerated deployment of capital across borders.

Benefits and Uses

By offering clear definitions of green economic activities, green taxonomies can assist the financial sector in identifying green and sustainable investments that contribute to a country's climate and environmental goals, thereby increasing transparency in financial markets and eliminating barriers to capital flows and prevent greenwashing.

Participants in the financial market, such as financial institutions, asset owners, investment managers, green bond and sukuk issuers, can utilize the Taxonomy to identify and allocate capital to activities and projects that aid a country in mitigating and adapting to climate change. Financial regulators can implement the reporting of Taxonomy-eligible and Taxonomy-aligned economic activities and assets in the financial sector with the aim of:

- Scaling up green financing in priority sectors to support the government's climate and environment-related policies.
- Enhancing the financial system's resilience to climate-related financial risks.

The PGT is designed to offer a range of benefits, including:

- Bringing clarity and consistency to sustainable investment efforts.
- Providing a clear framework for climate-related investments, which is essential to increase the capacity of domestic financial institutions to manage and mobilise climate finance effectively.
- Reducing financial risks by offering clear definitions of green and sustainable activities and enhancing environmental and social performance management.
- Lowering costs associated with identifying green investments, labelling and issuing green financial instruments.
- Unlocking potential investment opportunities for Pakistan in a broad range of green and climate-friendly assets.
- Promoting transparency and supporting regulatory and supervisory oversight of the financial sector.

Guiding Principles

The following guiding principles, as established in the Group of 20 Principles for Sustainable Finance Alignment, were followed to ensure interoperability and credibility [47]

- Principle-1: Ensure substantial contribution to sustainability goals and outcomes.
- Principle-2: Avoid negative contribution to sustainability goals.

2 Transitional activities are those that decarbonize high-emitting and hard-to-abate industries such as steel, aviation, and shipping.

3 According to UNEP, interoperability indicates that taxonomies should be based on similar guiding principles and have certain design elements such as objectives and classification systems for sectors and activities that are comparable and similar in approaches and methodologies used for defining eligibility. Interoperability enables taxonomies to be compared across jurisdictions and facilitates cross-border capital flows.

- Principle-3: Be dynamic in adjustments reflecting changes in policies, technologies, and state of transition.
- Principle-4: Reflect good governance and transparency.
- Principle-5: Be science-based for environmental goals and science and evidence-based for other sustainability issues.
- Principle-6: Address transition considerations.

Structure

The PGT is structured along the following lines:

- Environmental objectives
- Sectors and economic activities
- Screening criteria: substantial contribution criteria, Do No Significant Harm (DNSH) criteria and minimum social safeguards (MSS)

Environmental Objectives

The Taxonomy emphasizes economic activities that **contribute substantially to climate change mitigation and climate change adaptation**, while ensuring no significant harm to the following environmental objectives:

- Sustainable use and protection of water resources
- Protection of healthy ecosystems and biodiversity
- Pollution prevention and control
- Promotion of circular economy
- Sustainable land management

The tourism sector and the agriculture (including livestock), forestry, fishing and aquaculture sectors encompass activities and measures that **contribute substantially to multiple environmental objectives** simultaneously.

The interconnections between various environmental and climate objectives lead to certain economic activities yielding benefits across multiple objectives. For instance, the activity desalination for water supply in water-stressed areas, as outlined in the PGT, positively impacts both climate change mitigation and adaptation. Similarly, flood prevention measures implemented in waste management plants contribute to climate change adaptation as well as pollution prevention and control efforts. For more examples of activities with positive environmental and climate co-benefits, please refer to Annex 1.

Sectors and Activities

The sectors were identified through:

i. Qualitative assessments of national policies, regulations and priorities, including the NDC and the National Adaptation Plan;
ii. Quantitative evaluation of data such as the GDP contribution of sectors, GHG emissions, and the vulnerability and readiness index, and
iii. Evaluation of other green and sustainable finance taxonomies, including those from Bangladesh, Climate Bonds Initiative, China, the European Union, Indonesia, Malaysia, Singapore, Sri Lanka and Climate Bonds Initiative, etc.

On the other hand, the economic activities were identified through:

i. The use of classification systems, including the Pakistan Standard Classification of Economic Activities (PSIC) and the International Standard Classification of International Activities (ISIC) and
ii. The examination of different taxonomies. Additional activities deemed significant to the country but not included in other taxonomies were incorporated following consultation with stakeholders.

Annex 2 presents the key findings of the sectoral prioritisation exercise for climate change mitigation and adaptation.

The following sectors were prioritised in the 2025 edition of the PGT and validated by national experts to ensure their relevance to Pakistan.

Climate Change Mitigation

- Manufacturing
- Transport
- Energy
- Construction
- Water and waste
- Information and telecommunication (ICT)

Climate Change Adaptation

- Water
- Disaster risk management
- Urban resilience, including transport, ICT, construction, manufacturing, waste and energy

Multiple Environmental Objectives

- Agriculture (including livestock), forestry, fishing and aquaculture and tourism sectors contribute substantially to multiple environmental objectives, including climate change mitigation and adaptation, sustainable use and protection of water resources, protection of healthy ecosystems and biodiversity.

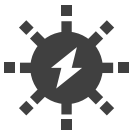
The PGT identifies 55 activities for the climate change mitigation objective and 101 practices in the agriculture (including livestock), forestry, fishing and aquaculture sector. A traffic light system is utilized to classify substantial contribution criteria into green, amber (transition) and red (ineligible) categories. Additionally, 77 activities or measures for climate change adaptation were identified, along with seven green investment categories for the Tourism sector.

The Taxonomy is designed to align with the objectives of the SDGs. Box 1 shows the linkage between the sectors covered in the Taxonomy with relevant SDGs.

Box 1. Linkage of the Sectors Covered in the Pakistan Green Taxonomy with Relevant SDGs

	Sector	Taxonomy Ambition	Relevant SDG
	**Manufacturing**	Accelerate the industrial sector's transition to low-emission, resource-efficient technologies within circular economy models, while strengthening resilience to climate change impacts, including extreme weather events, resource scarcity, and supply chain disruptions	

(Continued on the next page)

	Sector	Taxonomy Ambition	Relevant SDG
	**Transport**	Transform the transport sector through low-emission, climate-resilient infrastructure and mobility systems that enhance connectivity and reduce vulnerability to climate risks such as flooding, heat stress, and disruptions to critical logistics	
	**Energy**	Drive the energy sector's transition toward low-carbon, climate-resilient systems by expanding renewable energy, improving grid flexibility, and safeguarding energy infrastructure against climate hazards and resource variability	
	**Construction**	Promote the development of climate-resilient, low-carbon buildings and infrastructure through practices that minimize emissions and withstand extreme climate events	
	**Water**	Promote climate-resilient water management systems that ensure reliable access, efficient use, and protection of water resources under increasing climate stress, while promoting low-emission technologies through energy-efficient water infrastructure and reduced water loss	
	**Waste**	Strengthen the waste sector's contribution to climate adaptation and mitigation by scaling up low-emission and climate-resilient infrastructure, and advancing sustainable waste management systems to reduce greenhouse gas emissions and protect public health under increasing climate stress	
	**Information and Telecommunication (ICT)**	Build a resilient, low-emission ICT infrastructure that supports climate adaptation across all sectors by ensuring continuity of digital services during extreme events, improving energy efficiency, and advancing technological solutions for greenhouse gas emissions tracking, early warning systems, and climate risk management	

(Continued on the next page)

	Sector	Taxonomy Ambition	Relevant SDG
	Tourism	Foster a sustainable, low-impact tourism sector that adapts to climate variability by protecting natural and cultural assets, inclusion of low carbon infrastructure, while building resilience of local communities	
	Agriculture (Including Livestock), Forestry, Fishing and Aquaculture	Promote the sustainable and climate-resilient management of agriculture, livestock, forestry, and fisheries while enhancing productivity, reducing greenhouse gas emissions, and safeguarding livelihoods against climate change impacts	
	Disaster Risk Management	Enhance climate-adaptive disaster risk management by strengthening early warning and preparedness systems, and implementing nature-based and engineered solutions that reduce vulnerability and exposure, allowing communities and sectors to anticipate and recover swiftly from climate-related hazards	

Screening Criteria

Screening criteria refer to the specific, measurable standards or thresholds employed to ascertain whether an economic activity qualifies as environmentally sustainable. These criteria are designed to assess the activity's alignment with defined environmental objectives and to determine its substantial contribution to these objectives.

The screening criteria encompass performance metrics, technical requirements, and minimum thresholds that must be met to ensure that the activity contributes positively to environmental and social goals.

Within the framework of the PGT, an economic activity must fulfill the following conditions to be deemed environmentally sustainable:

- It must make a **substantial contribution** to at least one environmental objective.
- It must adhere to the principle of causing **no significant harm** to any of the other five environmental objectives, and
- It must comply with minimum social safeguards.

Substantial Contribution Criteria

Substantial contribution denotes that an economic activity makes a meaningful and measurable contribution to defined environmental goals.

For the **climate change mitigation activities**, substantial contribution is based on technical screening criteria comprising metrics and thresholds that are quantifiable or verifiable. The PGT employs a traffic light system to indicate varying levels of contribution to the environmental objective:

Green	Activities that contribute substantially by operating at near-zero emissions or are aligned with a 1.5°C pathway
Amber	Activities that are not currently aligned with a 1.5°C pathway but are progressing towards a green transition pathway or facilitate significant emissions reduction in the short term.[4]
Red	Activities that are not eligible under the Taxonomy.

For **climate change adaptation activities**, substantial contribution criteria are defined through: i) the use of specific quantifiable or verifiable metrics and thresholds, ii) use of criteria based on demonstration of climate risk reduction or resilience enhancement through an assessment, and iii) automatically eligible activities and measures for which the risk of maladaptation is known to be low, iv) generic technical criteria for adapted activities and activities that enable substantial contributions to adaptation in a cross-cutting manner. Since adaptation to climate change is context- and region-specific, this option can be applied to activities in all sectors.

For activities in the **agriculture (including livestock), forestry, fishing and aquaculture** the substantial contribution criteria are based on a practice-based approach classified as basic, intermediate, or advanced depending on the level of complexity. In the **tourism sector**, various categories of green investment are established to support multiple environmental objectives.

Do No Significant Harm (DNSH)

The **Do No Significant Harm (DNSH)** requirements comprise a set of criteria designed to guide and ensure that the activities identified in the Taxonomy do not cause negative environmental harm, such as the installation of a solar power plant within a special protected natural area. A list of general requirements applicable to all activities is outlined in Table 1. The specific DNSH criteria are detailed within the definitions of the respective activities.

4 The Amber criteria have a sunset date to ensure movement towards green. The sunset dates are aligned with Pakistan's NDC (2030), except for the following activities that are very hard to abate: manufacturing of basic chemicals, cement, aluminum (2035), and construction of water collection and treatment systems (2028, 2030, and 2035) [51].

Table 1. Generic Do No Significant Harm (DNSH) Requirements

Environmental Objective	Do No Significant Harm (DNSH) Requirements
Climate Change Adaptation	Ensure that all investments in physical assets incorporate appropriate maintenance programmes and measures designed to ensure the resilience of the infrastructure to climate change. The International Standards Organisation 14091:2021 standard can be used as a reference. Verify whether the activity or project is consistent with the sectoral, regional, or national adaptation efforts set out in the National Adaptation Plan of Pakistan. The interventions being undertaken should not lead to maladaptation or increase risk unintentionally.
Sustainable Use and Protection of Water Resources	Identify, assess, and manage risks associated with water use and conservation, if applicable.[5] Verify that the activity does not lead to irrational use of water or over-extraction of groundwater resources and that the necessary measures will be taken to reduce water consumption and keep costs low. Ensure that Ramsar Sites and ecologically sensitive wetlands are not overexploited and assess the effect of water extraction on groundwater recharge rates and aquatic biodiversity, when applicable. If assets or activities are in water-stressed areas,[6] ensure that water use and conservation management plans, developed in consultation with relevant local entities, have been implemented. Under the Pakistan Environmental Protection Act, ensure that projects such as dam construction, water extraction for industries, and large-scale irrigation, undergo an environmental impact assessment before approval. Review the National Environmental Quality Standards[7] (or the respective environmental quality standards applicable in each province) and ensure that they are adhered to according to the type of activity or project, specifically for Drinking Water Quality Standards.
Protection of Healthy Ecosystems and Biodiversity	Do not locate a new activity or project in an ecosystem that is strategic for food security or rich in biodiversity or that provides a habitat for endangered species (flora and fauna).[8] Perform an appropriate assessment of activities and projects located in or near biodiversity-sensitive areas (defined as areas identified as United Nations Educational, Scientific, and Cultural Organization World Heritage sites, key biodiversity areas, or other protected areas. The Convention on Biological Diversity's Voluntary Guidelines on Biodiversity Inclusive Impact Assessment and International Finance Corporation Performance Standard 6 can serve as a reference (depending on the scale of the project).
Pollution Prevention and Control	Ensure that the activity or project does not result in significantly greater emissions of pollutants to the air, water, or soil than before the start of the activity (including generation of hazardous waste). Under PEPA, projects that are likely to emit significant levels of greenhouse gases into the atmosphere or other pollutants such as waste or wastewater, into the soil and water, must undergo an environmental impact assessment. Ensure adherence to the National Environmental Quality Standards according to type of activity or project.

5 Different water risk analysis tools are available (e.g., risk assessments by national environmental authorities, the water footprint method, World Wildlife Fund Water Risk Filter, World Resources Institute Aqueduct).

6 Water stress areas in Pakistan can be identified using indicators such as the Falkenmark Indicator, which measures the relationship between available water and population. (See the Water Scarcity Atlas: https://surl.li/pdoegf).

7 The National Environmental Quality Standards (NEQS) are national standards of pollution levels by industries.

8 The exclusion list provided in the Environmental and Social Risk Management Implementation Manual developed by the State Bank of Pakistan (https://www.sbp.org.pk/smefd/circulars/2022/CL12-Annex-1.pdf) and the EIA Guidelines for Critical and Sensitive Areas, 1997 may serve as a reference.

Environmental Objective	Do No Significant Harm (DNSH) Requirements
Promotion of Circular Economy	Maximise efficient use, reduction, repair, recycling, and reuse of materials during the activity's operational lifecycle (e.g., using technical datasheets where available and ensuring the use of highly durable and recyclable equipment and components is prioritised entering into contractual agreements with recycling companies, and integrating recycling costs into project planning). Include a waste management system that is appropriate for the scale of the project. An environmental impact assessment, as mandated under the Pakistan Environmental Protection Act (PEPA), is essential for projects and industries that are likely to generate significant amounts of waste. Inappropriate waste disposal can contaminate groundwater and should trigger fines or penalties as stipulated in national and provincial regulations.
Sustainable Land Management	Requirements for this objective are relevant for the agricultural, forestry, and fishing sector (including livestock and aquaculture) and are described in Annex 6 and Annex 7.
Climate Change Mitigation	Ensure that the activity or project does not increase operational consumption of hydrocarbons (fossil gas, oil, or coal and their derivatives) or lead to lock- in of hydrocarbons.

Minimum Social Safeguards (MSS)

Minimum Social Safeguards (MSS) ensure that the eligible activity or project do not cause social harm, with the criteria applied at the entity level.

In the PGT, MSS are designed to ensure that entities aiming to demonstrate Taxonomy alignment of economic activities adhere to a minimum set of social norms. This is achieved through the assessment of social risks and ensuring compliance with social safeguards such as labour rights, community impacts, and other human rights considerations in project assessments.

The MSS criteria of the Taxonomy necessitate compliance with Pakistan's laws and regulations, as well as certain international standards that are widely recognized by the global capital markets.

The following criteria support adherence to each of the safeguards associated with various social pillars deemed relevant when conducting a social risk analysis. It is recommended that projects validate and monitor these criteria throughout the implementation phase. Depending on the project's scale, these criteria should be supplemented with additional impact analysis. For instance, large-scale projects may require enhanced safeguards for communities and ethnic groups through consultation frameworks and participatory mechanisms to ensure effective participation and impact mitigation.

Table 2 provides guidance on the following:

- Core social pillars that should be evaluated when analysing the minimum social safeguards of a project/ activity.
- The criteria to assess the compliance of the core social pillar
- Relevant national and international frameworks that support and guide the fulfilment of these social core pillars.
- Key performance indicators that can be utilized in social risk assessments.

Entities are required to ensure the enforcement of mandatory human rights due diligence and impact assessments at every stage of project design, implementation, and evaluation. This is to ensure that all investments align with international human rights standards and do not exacerbate inequalities or social harms.

Table 2. Minimum Social Safeguards Criteria

Social Core Pillars	Criteria	Relevant National and International Operational and Human Rights Standards or Regulations *(Non-exhaustive list)*	Example of Key Performance Indicators (KPI) *(Non-exhaustive list based on: ESRM by SBP, SECP ESG disclosure guidelines, Basel Principles, SASB, IFRS – GRI)*
Good Corporate Governance	• The entity responsible for development of the project or activity has a corporate governance policy, that includes environmental and social aspects	• Companies Act, 2017 • Securities Act, 2015 • Listed companies (Code of Corporate Governance) Regulations, 2019 • Guidelines on Environmental, Social and Governance Disclosures for Listed Companies, 2023 developed by SECP (Social category: global health & safety) • Annexes A, D, and E of the Environmental and Social Risk Management Implementation Manual developed by the State Bank of Pakistan. • Environmental and Social Due Diligence Risk Assessment Tool developed by SBP • Public Sector Companies (Corporate Governance) Rules, 2013 • Pakistan Stock Exchange Listing Rules • IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts. • OECD Principles of Corporate Governance • International Financial Reporting Standards • Basel III Banking Regulations	• Does the entity have a robust/ or adequate Environmental and Social Management system? • Does the entity have policies for climate and social risk assessment? • Number of legal issues associated with the entity's E&S performance • Number of operations that local stakeholder grievances, media coverage, or nongovernmental organisations campaigns have affected over environmental and social (E&S) issues • Does the entity publish a sustainability report? • Does the entity provide sustainability data in line with any sustainability reporting frameworks? **Key SDG Targets:** • SDG 16: 16.6 Develop effective, accountable and transparent institutions at all levels. • SDG 16: 16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels

Social Core Pillars	Criteria	Relevant National and International Operational and Human Rights Standards or Regulations *(Non-exhaustive list)*	Example of Key Performance Indicators (KPI) *(Non-exhaustive list based on: ESRM by SBP, SECP ESG disclosure guidelines, Basel Principles, SASB, IFRS – GRI)*
Occupational Health and Safety	• The entity responsible for developing the project or activity has a workplace health and safety policy and reports on work-related illnesses and injuries • The entity responsible for developing the project or activity does not have any occupational health and safety concern or have mitigated them adequately.	• Occupational Safety and Health Code of Practice for the Construction Sector of Pakistan (OSH-CSP-2024), which is based on the ILO Code of Practice. • Safety and Health in Construction - 2022 • Annexes A, D, and E of the Environmental and Social Risk Management Implementation Manual developed by the State Bank of Pakistan. • Environmental and Social Due Diligence Risk Assessment Tool developed by SBP • Guidelines on ESG Disclosures for Listed Companies, 2023 developed by SECP (Social category: global health and safety)	• Does the entity follow an occupational health or global health & safety policy? • Description of efforts to assess, monitor, and reduce exposure of employees and contract workers to long-term (chronic) health risks • Hazard identification, risk assessment, and incident identification; occupational health services; employee participation; Workers training on occupational health and safety; Promotion of employees' health; Prevention and mitigation of occupational health and safety impacts, directly linked to the company through its business relationships; Worker covered by occupational health and safety management system; employees protected against work-related injuries and ill health. • Percentage of frequency of injury events relative to total workforce time **Key SDG Targets:** • SDG 3.9 Mortality from environmental pollution: Reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination • SDG 8.8 Protect labour rights and promote safe and secure working environments of all employees, including migrant workers, particularly women migrants, and those in precarious.

Social Core Pillars	Criteria	Relevant National and International Operational and Human Rights Standards or Regulations *(Non-exhaustive list)*	Example of Key Performance Indicators (KPI) *(Non-exhaustive list based on: ESRM by SBP, SECP ESG disclosure guidelines, Basel Principles, SASB, IFRS – GRI)*
Labour and Working Conditions	• The entity responsible for developing a project or activity provides fair and responsible remuneration to all its employees and reports on labour practices, including for people employed under collective agreements	• The Industrial Relations Act, 2012 • International Labour Organization (ILO) Convention 107 (1957) (ratified by Pakistan) • ILO Convention 100 (Equal Remuneration) – Ratified in 2001 • C087 - Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87) • C011 - Right of Association (Agriculture) Convention, 1921 (No. 11) • Annex A, D, and E of the Environmental and Social Risk Management Implementation Manual developed by the State Bank of Pakistan. • Environmental and Social Due Diligence (ESDD) Risk Assessment Tool developed by SBP • Guidelines on ESG Disclosures for Listed Companies, 2023 developed by SECP (Social category: Employee Turnover) • IFC Performance Standard 2: Labour and working conditions	• Number of legal challenges of labour unrest or negative media coverage or protest from activist for poor working conditions. • Description of how the entity manages freedom of association and collective bargaining. • Description of how the entity manages labour/ management relations in compliance with key national and international human rights conventions or standards. **Key SDG Targets:** • SDG 8.8 Protect labour rights and promote safe and secure working environments of all workers, including migrant workers, particularly women migrants, and those in precarious.

Social Core Pillars	Criteria	Relevant National and International Operational and Human Rights Standards or Regulations *(Non-exhaustive list)*	Example of Key Performance Indicators (KPI) *(Non-exhaustive list based on: ESRM by SBP, SECP ESG disclosure guidelines, Basel Principles, SASB, IFRS – GRI)*
Community Engagement	• The entity responsible for developing a project or activity has a community engagement strategy, that has been developed in consultation with the local community and has established processes to manage risks and opportunities associated with community rights and interests including community health and safety. • There is no evidence of issues that may create nuisance/accidents/injuries to the local community with the project that cannot be mitigated. • All projects or activities are community-centred and context-specific, championing community-led, local solutions and needs. • All economic activities include transfer of technology and knowledge to local communities and relevant stakeholders wherever applicable. • The entity responsible for developing the project or activity must ensure formal Civil Society Organisation engagement mechanisms to align investment strategies with community needs and strengthen governance, accountability, transparency, and decision-making, when applicable.	• Annex A, D, and E of the Environmental and Social Risk Management Implementation Manual developed by the State Bank of Pakistan. • Environmental and Social Due Diligence Risk Assessment Tool developed by SBP • UN Convention on Civil and Political Rights and UN Convention on Economic, Social and Cultural Rights (ratified by Pakistan) • IFC Performance Standard 4: Community health, safety, and security • Environmental Impact Assessments require public hearings before large-scale development projects are approved.	• Percentage of operations with implemented local community engagement, impact assessments, and/or development programmes. • Percentage of operations with significant actual and potential negative impacts on local communities. • Description of how stakeholders, including the local community, are consulted or engaged on all relevant issues (such as rehabilitation, compensation, and their expectations, as the case may be) **Key SDG Targets:** • SDG 11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.

Social Core Pillars	Criteria	Relevant National and International Operational and Human Rights Standards or Regulations *(Non-exhaustive list)*	Example of Key Performance Indicators (KPI) *(Non-exhaustive list based on: ESRM by SBP, SECP ESG disclosure guidelines, Basel Principles, SASB, IFRS – GRI)*
Indigenous and Tribal Communities	• The entity responsible for developing a project or activity shall conduct due diligence and implement community engagement processes such as Free, Prior and Informed Consent (FPIC), or equivalent process for Indigenous People, marginalized groups, and affected local communities, before any development projects are approved and implemented, if applicable (e.g., for aspects such as human rights, indigenous rights, operation in areas of conflict).	• C107 - Indigenous and Tribal Populations Convention, 1957 (No. 107)[9] (ratified by Pakistan) • Annex A, D, and E of the Environmental and Social Risk Management Implementation Manual developed by the State Bank of Pakistan. • Environmental and Social Due Diligence Risk Assessment Tool developed by SBP • Free, Prior, and Informed Consent: FPIC is a specific right for Indigenous Peoples as recognised in the United Nations Declaration on the Rights of Indigenous Peoples. Applicable to projects that may affect local communities. • United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) – 2007 • Convention on Biological Diversity – 1992 (Pakistan is a party to this convention) • UN Convention on Civil and Political Rights and UN Convention on Economic, Social and Cultural Rights (ratified by Pakistan) • IFC Performance Standard 7: Indigenous peoples	• Percentage of (1) proved and (2) probable reserves in or near indigenous land. • Evidence that the project/ activity developers consults/engages with the stakeholders including indigenous people on all relevant issues (such as rehabilitation, compensation, their expectations as the case may be) • Number of signed binding agreements specifying commitments, rights and benefits with the Indigenous and Tribal Communities. • Number of mechanisms for the community to supervise the execution of the agreement. • Number of penalties for Free, Prior, and Informed Consent Failure. **Key SDG targets:** • SDG 11.4: Strengthen efforts to protect and safeguard the world's cultural and natural heritage

9 ILO Convention 169 is still pending and there is a need to incorporating indigenous rights into national laws.

Social Core Pillars	Criteria	Relevant National and International Operational and Human Rights Standards or Regulations *(Non-exhaustive list)*	Example of Key Performance Indicators (KPI) *(Non-exhaustive list based on: ESRM by SBP, SECP ESG disclosure guidelines, Basel Principles, SASB, IFRS – GRI)*
Gender Equality	• The entity responsible for developing a project or activity has designed, implemented and communicated a diversity policy to promote gender inclusion at all employee levels and that is applied to all projects that the entity develops.	• The Workmen's Compensation Act, 1923 • Convention on the Elimination of All Forms of Discrimination Against Women– 1996 • C018 - Workmen's Compensation (Occupational Diseases) Convention, 1925 (No. 18) • C019 - Equality of Treatment (Accident Compensation) Convention, 1925 (No. 19) • C118 - Equality of Treatment (Social Security) Convention, 1962 (No. 118) • Articles 25, 34 and 37 of the Constitution of Pakistan • National Commission on the Status of Women– 2000 • Women Protection Act – 2006 • Protection Against Harassment of Women at Workplace Act – 2010 • A, D, and E of the Environmental and Social Risk Management Implementation Manual developed by the State Bank of Pakistan. • Guidelines on ESG Disclosures for Listed Companies, 2023 developed by SECP (Social category: Gender Diversity)	• Percentage Total enterprise headcount held by men and women • Percentage of women in project leadership roles (e.g., managers, decision-makers). • Percentage of women in project workforce (compared to men). • Percentage of women-led businesses or organizations involved in the project. • Percentage of women and marginalized gender groups consulted during project planning. **Key SDG Targets:** • SDG 5: Achieve gender equality and empower all women and girls.

Social Core Pillars	Criteria	Relevant National and International Operational and Human Rights Standards or Regulations *(Non-exhaustive list)*	Example of Key Performance Indicators (KPI) *(Non-exhaustive list based on: ESRM by SBP, SECP ESG disclosure guidelines, Basel Principles, SASB, IFRS – GRI)*
Land Acquisition and Involuntary Resettlement	• The entity responsible for developing the project or activity must ensure that projects do not displace of vulnerable communities • The entity responsible for developing a project or activity ensures the establishment of consultation and grievance mechanisms for ensuring citizen participation, conflict resolution, and accountability. • If the project requires total or partial resettlement of populations, the entity has a resettlement plan that addresses community needs and complies with national and international legal frameworks, providing compensation to affected people for loss of assets at full replacement cost.	• Land Acquisition Act, 1894 (LAA 1894)[10] • Punjab Land Revenue Act, 1967 • Sindh Revenue Act, 1967 • Balochistan Revenue Act, 1967 • Khyber Pakhtunkhwa Revenue Act, 1967 • National Resettlement Policy (2002) (Not yet fully adopted) • Pakistan Environmental Protection Act, 1997 environmental impact assessment for large projects • Annex A, D, and E of the Environmental and Social Risk Management Implementation Manual developed by the State Bank of Pakistan. • Performance Standard 5: Land acquisition and involuntary resettlement • World Bank Operational Policy4.12 – Involuntary Resettlement • UN Basic Principles on Evictions (2007)	• Percentage of land acquisitions completed in accordance with national laws and international standards • Percentage of land acquisitions that involved meaningful consultation with affected communities. • Percentage of people who were able to continue their traditional land use or cultural practices. • Number of disputes or grievances raised and resolved related to land acquisition. • Percentage of land acquisitions conducted through voluntary agreements versus involuntary resettlement. • Percentage of displaced persons who received alternative land or housing of equal or better value. • Satisfaction levels of affected communities regarding compensation and resettlement. **Key SDG Targets or Indicators:** • SDG 1.4.2 – Proportion of total adult population with secure land tenure rights. • SDG 5.a.1 – Proportion of total agricultural population with ownership or rights over agricultural land, by sex. • SDG 5.a.2 – Legal frameworks to protect women's land rights

10 However, does not address **involuntary resettlement, livelihood restoration, or indigenous rights. The Right to Fair Compensation and Transparency in Land Acquisition, Resettlement, and Rehabilitation Bill (Proposed, 2017)** was intended to replace the outdated Land Acquisition Act, 1894.

Social Core Pillars	Criteria	Relevant National and International Operational and Human Rights Standards or Regulations *(Non-exhaustive list)*	Example of Key Performance Indicators (KPI) *(Non-exhaustive list based on: ESRM by SBP, SECP ESG disclosure guidelines, Basel Principles, SASB, IFRS – GRI)*
Cultural Heritage Protection	• The entity responsible for a development of a project or activity ensures that the project does not affect cultural heritage sites. If applicable conduct a cultural heritage impact assessment is conducted. There are special exclusions for World Heritage Sites that UNESCO has designated. • If the project involves use of knowledge, innovations or practices of local communities for commercial purposes, it shall conduct a consultation process with such communities, document it and ensure fair and equitable sharing of benefits from commercialisation.	• Annex A, D, and E of the Environmental and Social Risk Management Implementation Manual developed by the State Bank of Pakistan. • Antiquities Act, 1975 (Main Law for Cultural Heritage Protection) • The Punjab Heritage Act, 2005 • The Sindh Cultural Heritage (Preservation) Act, 1994 • Khyber Pakhtunkhwa Antiquities Act, 2016 • Gilgit-Baltistan Antiquities Act, 2016 • UNESCO 1972 World Heritage Convention[11] • UNESCO 2003 Convention for the Safeguarding of Intangible Cultural Heritage • IFC Performance Standard 8: Cultural heritage	• Percentage of projects conducting cultural heritage impact assessments (CHIA) before development. • Percentage of cultural heritage sites legally designated and protected in the project area. • Percentage of identified heritage sites that have received conservation measures. **Key SDG Targets:** • SDG 11.4: Strengthen efforts to protect and safeguard the world's cultural and natural heritage.

11 Pakistan is committed to **protecting and conserving its World Heritage Sites**, including Mohenjo-Daro (Sindh), Taxila (Punjab), Lahore Fort & Shalimar Gardens (Punjab), Makli Necropolis (Sindh), Rohtas Fort (Punjab), Takht-i-Bahi Monastery (KPK).

Social Core Pillars	Criteria	Relevant National and International Operational and Human Rights Standards or Regulations *(Non-exhaustive list)*	Example of Key Performance Indicators (KPI) *(Non-exhaustive list based on: ESRM by SBP, SECP ESG disclosure guidelines, Basel Principles, SASB, IFRS – GRI)*
Non-Discrimination, Diversity and Equal Opportunity	• The entity responsible for the development of a project or activity has implemented and communicated a diversity policy to ensure that every employee is treated equally and has equal opportunities without discrimination.	• C111 - Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	• Number of formal non-discrimination and equal opportunity policies in the entity. • Percentage of leadership/ executive positions held by diverse groups. • Percentage of projects within the company complying with national and international non-discrimination laws • Number of complaints related to workplace discrimination and their resolution rate • Percentage of employees with disabilities hired in the entity/project. **Key SDG Targets:** • SDG 16.b. Promote and enforce non-discriminatory laws and policies for sustainable development.

Social Core Pillars	Criteria	Relevant National and International Operational and Human Rights Standards or Regulations *(Non-exhaustive list)*	Example of Key Performance Indicators (KPI) *(Non-exhaustive list based on: ESRM by SBP, SECP ESG disclosure guidelines, Basel Principles, SASB, IFRS – GRI)*
Modern Slavery *(forced labour, bonded labour, child labour, human trafficking, and domestic servitude)*	• The entity responsible for the development of a project or activity must report on the risks of modern slavery in its operations and supply chains including reporting on entities directly owned and entities owned or controlled by those entities. The entity must have an anti-slavery policy for all of its operations.	• Guidelines on Environmental, Social And Governance Disclosures for Listed Companies, 2023 developed by SECP (Social category: Child & Forced Labor) • C182 - Worst Forms of Child Labour Convention, 1999 (No. 182) • Article 11, 37 of the Constitution of Pakistan • Bonded Labour System (Abolition) Act, 1992 • Prevention of Trafficking in Persons Act, 2018 • Employment of Children Act, 1991 • Punjab Prohibition of Child Labor at Brick Kilns Act, 2016 • C029 - Forced Labour Convention, 1930 (No. 29) • C105 - Abolition of Forced Labour Convention, 1957 (No. 105)[12] • C138 - Minimum Age, 1973 (No. 105)	• Percentage of suppliers and contractors complying with anti-slavery laws. • Number of labour rights violations reported and addressed (e.g., unpaid wages, passport confiscation, restricted movement) • Percentage of workers below legal working age in project operations or supply chains. **Key SDG Targets:** • SDG 8.7. Take immediate and effective action to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms.

Annex 3 includes a general framework for alignment of an activity or project with the PGT.

12 All the ILO conventions ratified by Pakistan can be consulted at the following link: Ratifications of ILO conventions: Ratifications for Pakistan

Determining Taxonomy Alignment

An activity or project is **eligible** when the **sector and activity** is **listed** in the Taxonomy. An activity is deemed **aligned** with the Taxonomy if it fulfills the **substantial contribution criteria**, adheres to applicable generic and specific **DNSH requirements**, and complies with the **MSS** (see more information in Annex 3).

This chapter illustrates the steps that an activity/project must take to demonstrate its **alignment** with the Taxonomy. Figures 1 and 2 demonstrate how the PGT can be employed to ascertain whether a project or activity makes a substantial contribution to climate change mitigation and adaptation objectives. Figures 3 and 4 illustrate how the PGT can be utilized to evaluate whether a project or activity in the land use and tourism sectors makes a substantial contribution to multiple environmental objectives.

Figure 1. Taxonomy Application for Sectors and Activities That Contribute Substantially to Climate Change Mitigation Objective

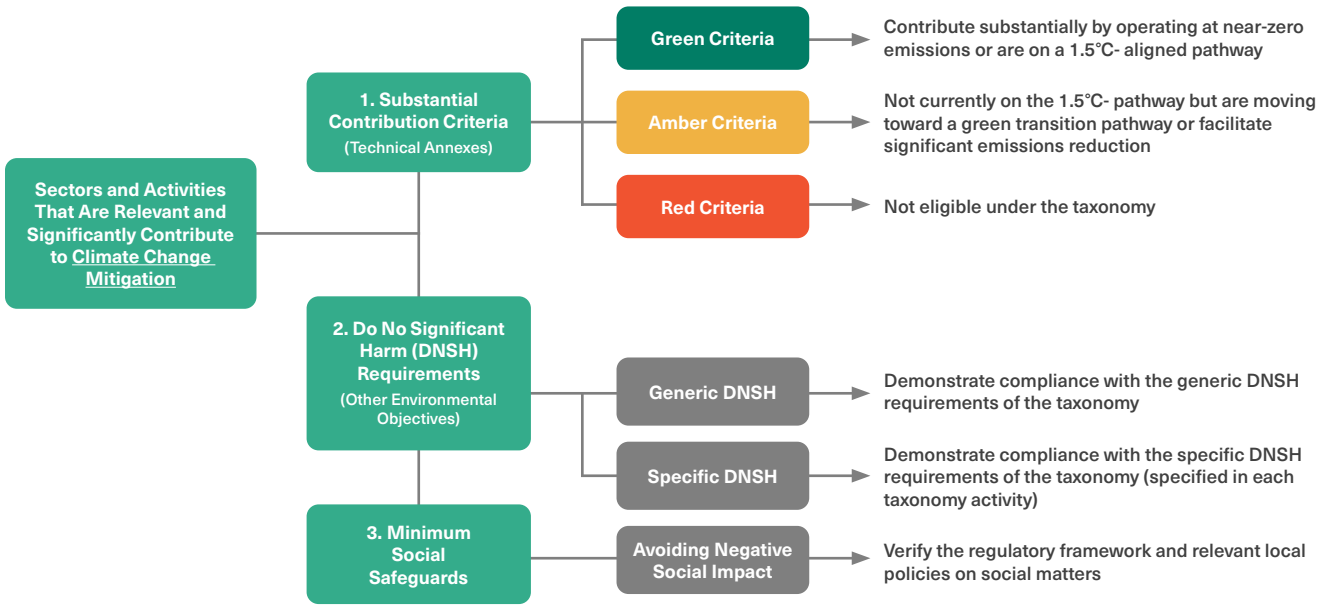


Figure 2. Taxonomy Application for Sectors and Activities That Contribute Substantially to Climate Change Adaptation Objective

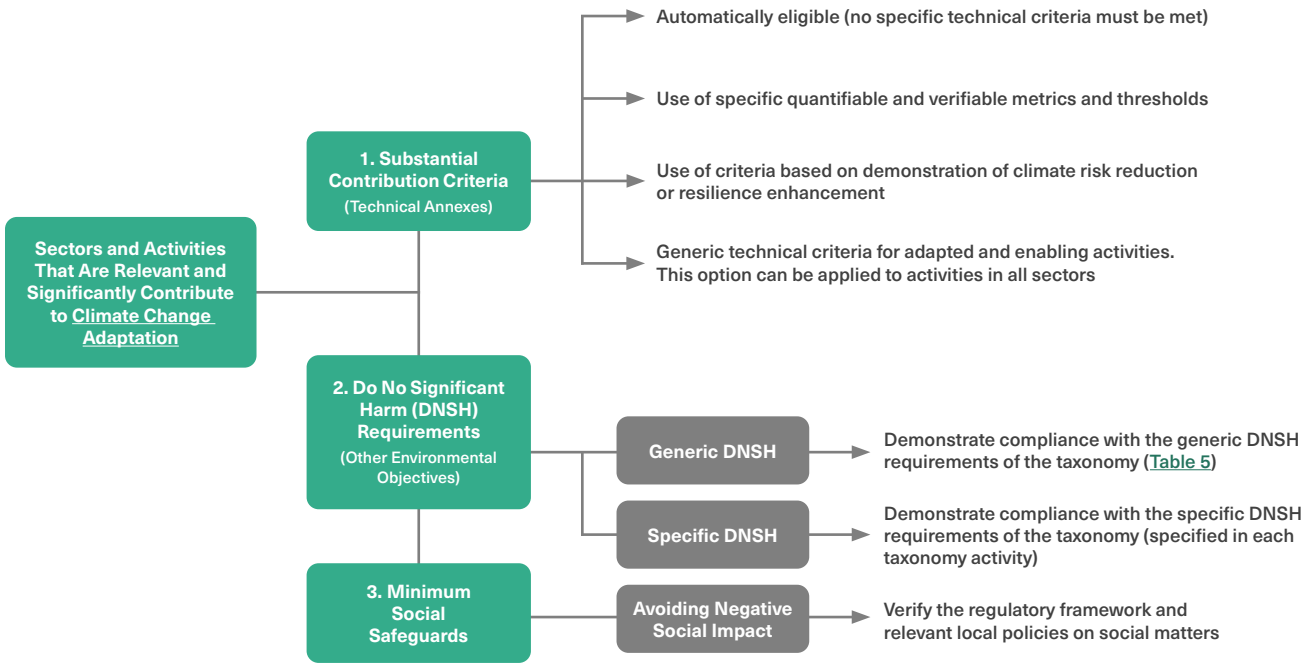


Figure 3. Taxonomy Application for Activities in the Agriculture (Including Livestock), Forestry, Fishing and Aquaculture Contributing to Multiple Environmental Objectives

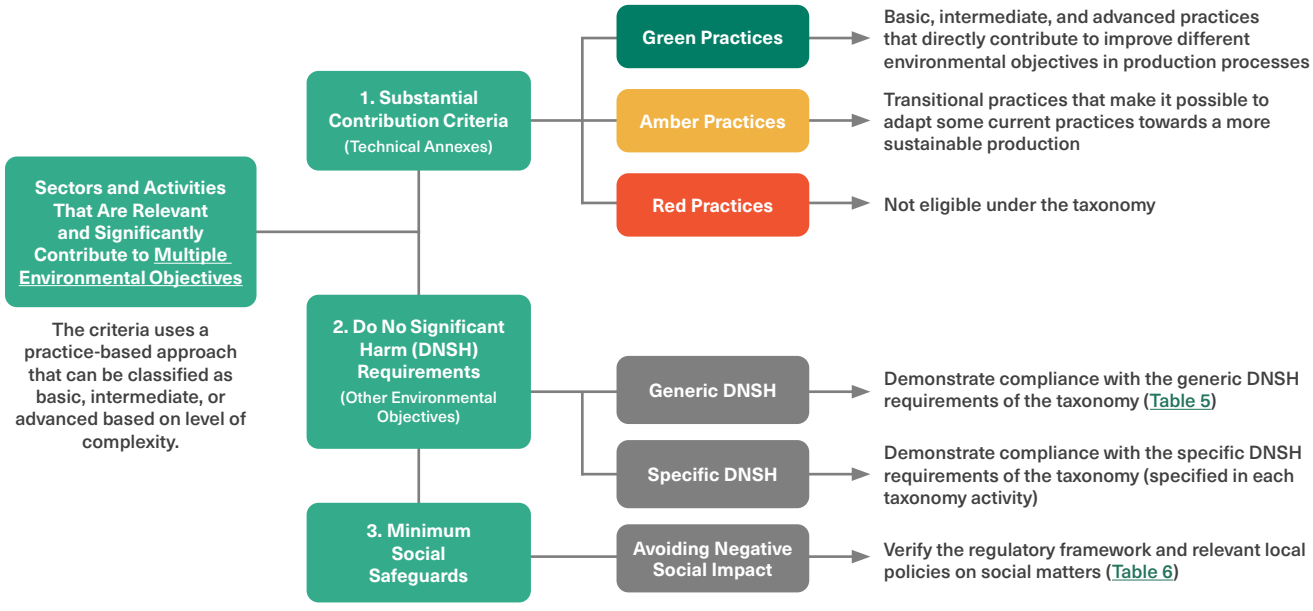
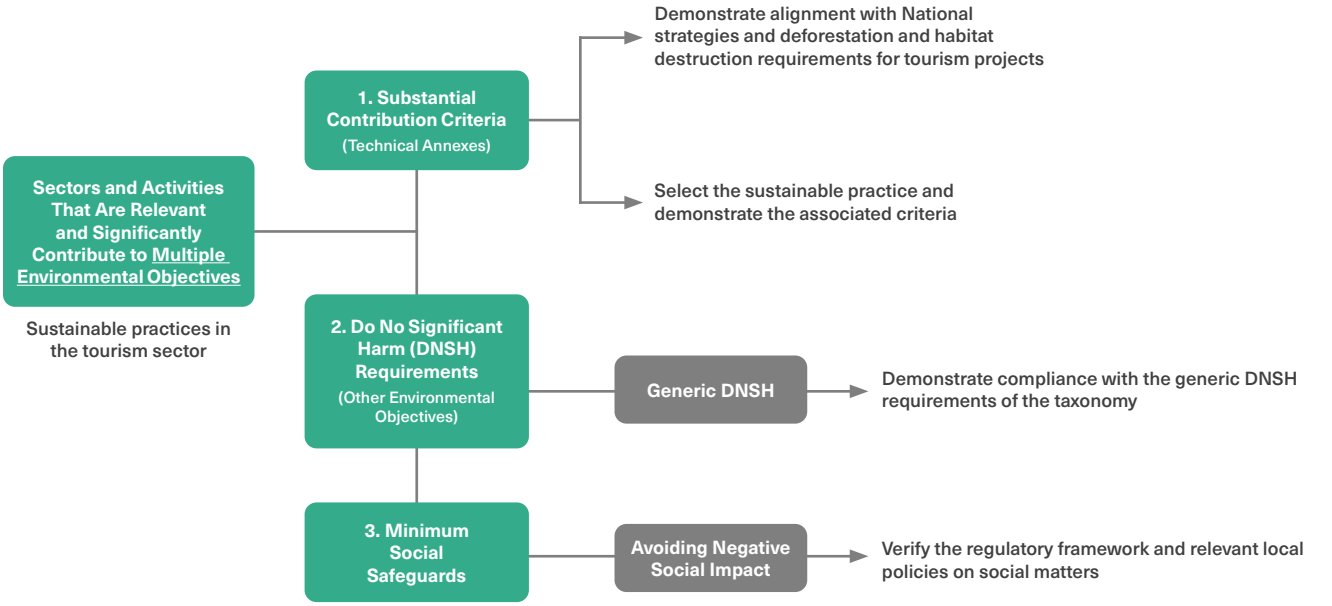
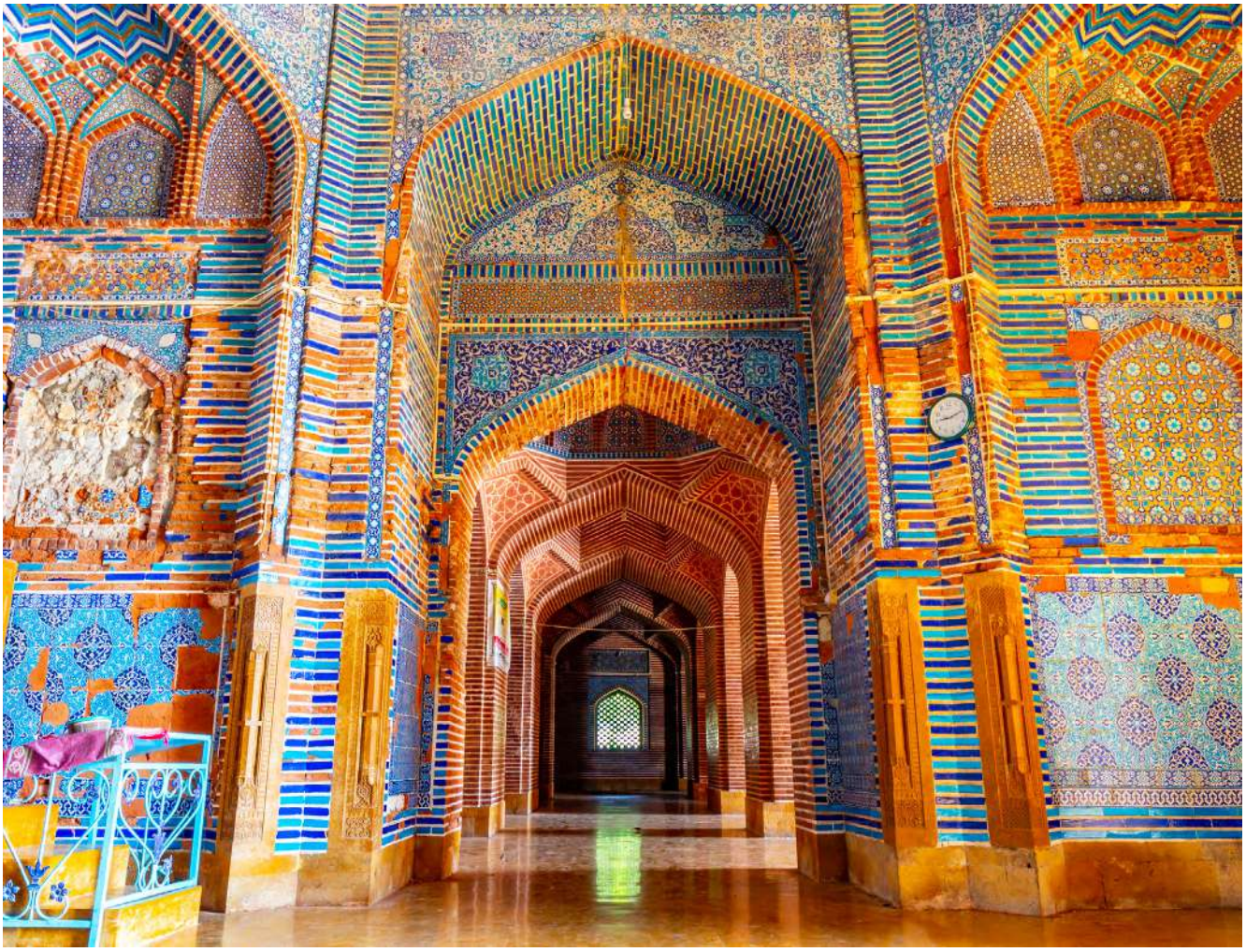


Figure 4. Taxonomy Application for Tourism Sector





Technical Screening Criteria

This chapter identifies and defines activities that meet Pakistan's climate change mitigation and adaptation objectives in each sector. It also highlights sustainable practices in agriculture (including livestock), forestry, fishing and aquaculture, as well as tourism sectors. The identified activities not only support climate change mitigation and adaptation but also promote sustainable use and protection of water resources, as well as the protection of healthy ecosystems and biodiversity.

Each activity is presented with technical screening criteria. To confirm that an activity makes a substantial contribution to an environmental objective, it must meet these technical criteria. Additionally, the activity must not cause significant harm to the remaining environmental objectives. The DNSH principle ensures that the economic activity under consideration does not impede the achievement of other environmental objectives.

Sectors and Activities that Contribute Substantially to Climate Change Mitigation

Pakistan is the world's 21st largest emitter of GHGs in absolute terms, contributing approximately 1 percent of global GHG emissions. The land use sectors, including agriculture (including livestock), forestry, fishing and aquaculture make the greatest contribution to GHG emissions, accounting for 46.78 percent of total emissions. This is followed by the energy sector, which accounts for 40.86 percent [48]. Pakistan ranks 8th globally among methane emitters [49], primarily due to emissions associated with agriculture and energy.

In addition to GHG emissions, economic activities in the transport, manufacturing, and agricultural sectors significantly impact air quality. Pakistan has the second-worst air quality globally, following Bangladesh, with an average PM2.5 concentration(µ/m3) that is 14.7 times the World Health Organisation annual air quality guideline value [50].

For each sector, a brief explanation is provided on how economic activities in the sector impact climate change mitigation, followed by a list of activities aligned with the climate change mitigation objective.

Manufacturing

GHG emissions from manufacturing are primarily caused by the use of fossil fuels in various industrial processes. This includes the production of fertilizers and the use of coal in cement manufacturing, the combustion of fossil fuels in the steel industry, and the reliance on fossil fuels in the chemical, paper, food, beverage, tobacco processing, textile, leather, and other industries. In 2021, manufacturing and industrial processes were responsible for 31.98 million tonnes of carbon dioxide equivalent (CO_2e) to Pakistan's total GHG emissions, underscoring the industrial sector as a significant contributor to the nation's emissions profile [51]. Consequently, it is imperative to address the inefficiencies in energy consumption generated by fossil fuel combustion in the industrial sector to reduce GHG emissions and air pollution, particularly in urban areas. In 2022/23, the manufacturing sector constituted 14.3 percent of the country's GDP. The textile sector is central to Pakistan's strategy for export-led growth [52]**.** Annex 4 lists the references used to determine the criteria for substantial contribution in the manufacturing sector.

The activities within this sector are listed below.

Activity	ISIC/PSIC Code
M1. Manufacture of basic chemicals	C2011
M2. Manufacture of cement	C2394
M3. Manufacture of iron and steel	C2410
M4. Manufacture of aluminium	C2420
M5. Manufacture of plastics	C2013
M6. Manufacture of batteries	C2720
M7. Manufacture of renewable energy technologies	C2710, C2720, C3510
M8. Manufacture of low-carbon technologies for transport	C2811, C29, C30
M9. Manufacture of energy efficiency equipment for buildings	C2740, C2750
M10. Manufacture of other low-carbon technologies	N.A.
M11. Manufacture of textiles	C1311, C1312, C1313, C1391, C1393, C1399, C1410, C1430, C1520
M12. Manufacture of bricks	C2392
M13. Research and development—professional services	N.A.
M14. General guidance for other manufacturing industries	N.A.
M15. Carbon capture, utilisation, and storage (CCUS)	N.A.

Technical screening criteria for the activities are listed below.

Sector	Manufacturing
Activity	**M1. Manufacture of basic chemicals**
ISIC/PSIC	C2011
Description	Manufacturing of organic basic chemicals with high efficiency levels (large volume at low cost) or those using renewable energy sources contributes substantially to the objective of mitigating climate change. Production of chemicals includes organic basic chemicals such as acids, anhydrides, industrial alcohols, ketones, aldehydes, fatty acids, turpentine, rosin, non-edible natural dyes, wood distillates such as gums and resins, and other basic organic products not classified elsewhere.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Manufacturing of chemicals covered in this activity must meet one of the following criteria: • GHG emissions from the production processes of basic organic chemicals should be lower than: — *0.693 tonnes of CO_2 equivalent (tCO_2e)/tonne (t) of high-value chemical (HVC)* — *0.0072 tCO_2e/t of a complex weighted yield of an aromatic* — *0.171 tCO_2e/t of vinyl chloride* — *0.419 tCO_2e/t of styrene* — *0.314 tCO_2e/t of ethylene oxide or ethylene glycol* — *0.32 tCO_2e/t of adipic acid* • Manufacture must be based entirely or partially on renewable raw materials. For application of these criteria, renewable raw materials refer to biomass, industrial biowaste, or municipal biowaste. — *If the raw material is biomass (excluding industrial and municipal biowaste):* » Complete traceability of the supply must be established through the corresponding chain-of-custody management system and its effectiveness demonstrated through appropriate certification systems. » All forest biomass used in the process must comply with forestry regulations and criteria established in the forestry sector. » A regularly audited independent third-party actor must certify any forest biomass used in the process. Forest management practices and chain of custody in supply areas that are not certified must be aligned with the requirements of the certification. » Forest biomass from irrigated forest plantations cannot be used. — *If the raw material is industrial biowaste (including from the food industry or municipal biowaste):* » It must comply with the regulatory framework for waste and with national, regional, and local waste management plans. » When municipal biowaste is used as a raw material, the biowaste is considered complementary and does not compete with existing municipal biowaste management infrastructure. » Organic chemicals are produced entirely or partially from renewable raw materials must have lower GHG emissions over the product's lifecycle than those manufactured from fossil fuels. GHG emissions (scope 1 and 2) are calculated using (ISO) 14067:2018 or 14064-1:2018. An independent third party must verify quantified GHG emissions. Note: The chemicals must have a substantially smaller carbon footprint than chemicals manufactured from chemical raw materials. This carbon footprint will be calculated according to ISO 14067:2018 and validated by a third party. For application of these criteria, renewable raw materials refer to biomass, industrial biowaste, or municipal biowaste.

Sector	Manufacturing
Activity	**M1. Manufacture of basic chemicals**
Amber (Transition)	Amber category is applicable until 2030; all eligible decarbonisation measures must be implemented before then. Criteria: • At least 50 percent of products manufactured are on the list of basic chemicals in scope. • The company has a transition plan that is aligned with the 1.5°C target of the Paris Agreement.
Red (Ineligible)	Facilities or measures in which: • The energy source is 100 percent coal or fossil fuel, and there is no transition plan to switch to a sustainable energy source. • Coal is used for on-site electricity generation.
DNSH Requirements	Prevention and control of pollution • Emissions from the production process are within emission levels associated with best available techniques and comply with applicable national – or provincial - environmental quality standards. • Implementation of treatment systems for wastewater generated in the manufacturing process to ensure that the treated water complies with applicable norms or environmental licenses.

Sector	Manufacturing
Activity	**M2. Manufacture of cement**
ISIC/PSIC	C2394
Description	The manufacture of cement aims to minimise process emissions by increasing energy efficiency, increasing use of alternative fuels and material co-processing for energy production, and promoting reduction of the cement clinker factor.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The process is considered green if it meets the following emissions criteria for clinker production and cement production: Clinker production: • Net (scope 1 and 2) emissions associated with clinker production processes are less than 0.8 tCO_2e/t of grey clinker produced. Cement production: • Net (scope 1 and 2) emissions associated with cement production processes are less than 0.6 tCO_2e/t of grey cement produced.
Amber (Transition)	Eligible decarbonisation measures or retrofitting activities (capital investments) must be implemented before 2035 and include one or more of the following measures. • Installation, upgrade, and operation of precalciners • Installation, upgrade, and operation of heat recovery systems • Installation of desulphurisation, denitrification, and dust removal facilities; exhaust treatment facilities for heavy metal gases • Installation, upgrade, and operation of digitised control equipment or infrastructure, including — *Sensors and measurement tools (e.g., software to allow real-time, close control of processes to increase efficiency)* — *Communication and control (e.g., advanced software and control rooms, automation of plant processes)*

Sector	Manufacturing
Activity	**M2. Manufacture of cement**
Amber (Transition)	• Installation, upgrade, and operation of testing equipment (e.g., automated X-ray diffractometer systems • Electrification of heat (e.g., electrified kiln processes) • Installation, upgrade, retrofit, and operation of measures to reduce emissions equivalent to the emissions mitigation required for facilities over the lifespan of the debt instrument, in compliance with Paris Agreement by 2035 • Installation, upgrade, and operation of carbon capture, utilisation, and storage equipment aligned with the Taxonomy criteria (Green category) • Infrastructure, revamp, or modification of equipment for cement production using hydrogen as a fuel that are aligned with the Taxonomy criteria for hydrogen (Green category) • Installation, upgrade, and operation of technologies that enable the clinker binder ratio to be reduced (proportion of clinker used in cement production) to 0.58 Note: Measures are applicable in a production facility where a company has a transition plan aligned with the 1.5°C target of the Paris Agreement.
Red (Ineligible)	Facilities or measures in which: • The energy source is 100 percent coal or fossil fuels and has no transition plan to switch to sustainable energy sources. • Coal is used for on-site electricity generation.
DNSH Requirements	Pollution prevention and control • Process emissions are within emission levels associated with the best available techniques and comply with local regulations. As per the Pakistan Environmental Protection Agency and national – or provincial - environmental quality standards, the overall limit for particulate matter emissions from cement plants is 300 mg/Nm^3. Although this standard does not specify separate limits for PM2.5 and PM10, it includes both within total suspended particulates. It is recommendable that the limit for particulate matter emissions from cement plants be less than 30 mg/Nm^3.[13] • Process discharges to water bodies are within emission levels associated with best available techniques and comply with local regulations. The Pakistan Environmental Protection Agency and the national environmental quality standards also establish regulations for water emissions from industrial activities. pH (6-9), temperature, suspended solids (200mg/L) and biochemical oxygen demand (80mg/l) are mentioned.

13 Threshold recommended by the Engineering Development Board. The European Union's Industrial Emissions Directive specifies that particulate emissions from cement kilns should not exceed 10 mg/Nm^3 and the Environmental Protection and Management (Air Impurities) Regulations in Singapore, the emission limit for particulate substances, which include materials such as cement dust, is set at 50 mg/Nm^3 [76] [77]

Sector	Manufacturing
Activity	**M3. Manufacture of iron and steel**
ISIC/PSIC	C2410
Description	This activity considers secondary production of steel, meaning use of recycled scrap steel, to be directly eligible because its emissions are significantly lower than with primary production, and it contributes to the circular economy.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The activity must meet at least one of the following criteria. • All steel produced in an electric arc furnace and for which at least 90 percent of the iron content of the final product comes from scrap steel is eligible. In this case, no other thresholds apply. • GHG emissions (scope 1 and 2) from production of iron and steel do not exceed the following values applied to the various manufacturing process steps: — *hot metal = 1.331 tCO_2e/t of product* — *sintered ore = 0.163 tCO_2e/t of product* — *coke (excluding lignite coke) = 0.144 tCO_2e/t of product* — *iron casting = 0.299 tCO_2e/t of product* — *electric arc furnace high alloy steel = 0.266 tCO_2e/t of product* — *electric arc furnace carbon steel = 0.209 tCO_2e/t of product* • Other melting technologies such as induction furnace, basic oxygen furnace with energy recovery, and hydrogen-based direct reduced ironmaking that meet the substantial contribution criteria for electric arc furnace are eligible. Note 1: All production of new green steel, or the combination of new steel production and recycling, is eligible if emissions are below the thresholds described above. Note 2: Mitigation measures are eligible when they are incorporated into a single investment plan within a specified time frame (5 or 10 years) that describes how each of the measures, in combination with others, allows the defined threshold to be met.
Amber (Transition)	Either of the following: • The facility has been designed to implement all necessary processes to meet green criteria by 2030. • From the onset of its operations, the facility is using carbon capture, utilisation, and storage that captures at least 20 percent of emissions. And: • The facility has a transition plan aligned with the 1.5°C target of the Paris Agreement.
Red (Ineligible)	Facilities or measures in which: • The energy source is 100 percent coal or other fossil fuels and has no transition plan to switch to sustainable energy sources. • Coal is used for on-site electricity generation. • Dedicated crops, primary organic streams, and wood are used as biomass or as reducing agents or for energy generation.
DNSH Requirements	All investments related to manufacturing of basic iron and steel plants must comply with the country's regulations regarding environmental protection. Sustainable use and protection of water resources • Comply with wastewater regulations and environmental permits necessary for the development of the economic activity. • Control emissions of hydrocarbons and suspended solids in water. • Control waste and products from coke and smelting operations, including tar and benzole.

Sector	Manufacturing
Activity	**M3. Manufacture of iron and steel**
DNSH Requirements	Pollution prevention and control • Control air emissions from coke manufacturing and smelting operations, especially particulate matter (dust), nitrogen oxides (NOx), sulphur dioxide, carbon monoxide (CO), chlorides, fluorides, volatile organic compounds, polycyclic aromatic hydrocarbons, dibenzo-dioxins, polychlorinated furans, and heavy metals and comply with applicable national – or provincial - environmental quality standards.

Sector	Manufacturing
Activity	**M4. Manufacture of aluminium**
ISIC/PSIC	C2420
Description	Manufacture of aluminium activity includes both primary and secondary aluminium manufacturing. Aluminium recycling contributes substantially to climate change mitigation because it has much lower emissions than primary production.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The activity must meet any of the following criteria. • Manufacture of secondary aluminium (production of aluminium from recycled aluminium) (directly eligible) • GHG emissions for primary aluminium production of 1.5 tCO_2e/t or less • Electricity consumption for electrolysis of 15.3 MWh/t of aluminium or less • Average carbon intensity of electricity used for primary aluminium production (electrolysis) of 100g of CO_2e/kWh or less (threshold defined in the energy sector for electricity generation, subject to periodic updates) Note: Mitigation measures are eligible if they are incorporated into a single investment plan within a specified timeframe (5 or 10 years) that describes how each of the measures, in combination with others, will meet the defined threshold.
Amber (Transition)	Amber category is applicable until 2030; all eligible decarbonisation measures must be implemented before 2030. Criteria: Decarbonisation measures that enable the facility to increase the share of renewable energy that it uses. Criteria are applicable within a production facility where the company has a transition plan aligned with 1.5°C.
Red (Ineligible)	N.A.
DNSH Requirements	Pollution prevention and control • Control emissions of perfluorocarbons, fluorinated gases, polycyclic aromatic hydrocarbons, particles (e.g., unused cryolite), and short-lived climate pollutants such as black carbon that have significant health impacts. Monitor hydrogen fluorides that can be toxic to vegetation. • Control dissolved fluorides and cyanides from spent pot lining material that can have significant environmental impacts, including contamination of groundwater and local water bodies. • Ensure that emissions from the production process are within emissions levels associated with best available techniques and comply with applicable national – or provincial - environmental quality standards.

Sector	Manufacturing
Activity	**M5. Manufacture of plastics in primary form**
ISIC/PSIC	C2013
Description	Plastic manufacturing should be considered eligible when at least 90 percent of the final plastic is not used for single-use consumer products, with single-use plastics understood to be those designed to be discarded after being used once without considering their potential for reuse (e.g., plastic beverage bottles, food wrappers, bottle caps, plastic bags). This must be confirmed through research and scientific studies, among other methods.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The activity complies with one of the following criteria: • Plastic is fully manufactured using mechanically recycled plastic waste. • If mechanical recycling is not technically feasible or economically viable, plastic in primary form is fully manufactured by chemically recycling plastic waste and the lifecycle GHG emissions of the manufactured plastic, excluding any calculated credits from production of fuels, are lower than the lifecycle GHG emissions of the equivalent plastic in primary form manufactured from fossil fuel feedstock. Lifecyle GHG emissions are calculated using ISO 14067:2018 or ISO 14064-1:2018. Quantified lifecycle GHG emissions are verified by an independent third party • Plastic is derived wholly or partially from renewable feedstock, and its lifecycle GHG emissions are lower than the lifecycle GHG emissions of equivalent plastic in primary form manufactured from fossil fuels. Lifecyle GHG emissions are calculated using ISO 14067:2018 or ISO 14064-1:2018. Quantified lifecycle GHG emissions are verified by an independent third party. Note: Fuel feedstock: Lifecycle GHG emissions are calculated using ISO 14067:2018 or ISO 14064-1:2018. Quantified lifecycle GHG emissions (scopes 1 and 2) are verified by an independent third party and food or feed crops are not used as bio-based feedstock for the manufacture of plastic. The activity must also meet the following criteria. • At least 90 percent of the produced plastic must not knowingly be used for single-use consumer products.
Amber (Transition)	The Amber activity complies with one of the following criteria: • At least 70 percent of the produced plastic must not be intended for single-use consumer products until 2030. • Plastic bottles must be manufactured containing at least 50 percent recycled plastic (Single-Use Plastics - Prohibition Regulations, 2023)[14] • Production plants must be transitioning from fossil fuels to solar, wind, or bioenergy (following the Taxonomy criteria)
Red (Ineligible)	Plastic manufactured for single-use consumer products are not eligible.
DNSH Requirements	Pollution prevention and control • Process emissions are within emission levels associated with best available technique and comply with applicable national – or provincial - environmental quality standards.

14 Pakistan has implemented several measures to address the environmental challenges that single-use plastics pose:
- Single-Use Plastics (Prohibition) Regulations, 2023. These regulations are designed to phase out single-use plastic items across Islamabad.
- Ban on Specific Single-Use Plastic Items: This ban prohibits such items as plastic dinnerware (plates, bowls, cups, glasses), cutlery (forks, knives, spoons, chopsticks), and food service ware (lidded containers, boxes). Single-use polythene bags were banned upon the regulations' implementation.

Sector	Manufacturing
Activity	**M6. Manufacture of batteries**
ISIC/PSIC	C2720
Description	Manufacture of rechargeable batteries; battery packs and accumulators for transport or stationary, on-grid, or off-grid energy storage; and other industrial applications; manufacture of respective components (battery active materials, battery cells, casings, electronic components)
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The activity complies with one of the following criteria: • The economic activity includes the manufacture and repurpose of rechargeable batteries, battery packs and accumulators (and their respective components), including from secondary raw materials, such as recycled plastics, that result in substantial GHG emission reductions in transport; stationary (provided to the grid), on grid and off-grid energy storage; and other industrial applications. • The economic activity recycles end-of-life batteries, including battery imports.
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	Pollution prevention and control • Ensure emissions to air, water and soil are prevented or minimised according to international and national standards (e.g., IFC Environmental, Health, and Safety Guidelines: Air Emissions and Ambient Air Quality; ISO 14001:2015 Environmental Management Systems Requirements with Guidance for Use; Strategic Approach to International Chemicals Management; ISO 11014:2009 safety data sheet for chemical products). Process emissions are within emission levels associated with best available techniques and comply with applicable national – or provincial - environmental quality standards. • Implement and adhere to a recognised environmental management system (e.g., 14001, eco-management and audit scheme). • Identify and manage risks related to water quality and consumption at the appropriate level. • Ensure that battery import is not banned under the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. Promotion of circular economy • Reuse and recycle batteries and electronics (in particular, critical raw materials therein) in accordance with the waste hierarchy. • Implement measures governing waste management to minimise and manage waste and material use, especially hazardous manufacturing waste, according to international standards and guidelines (e.g., King Abdullah Petroleum Studies and Research Center guide to circular economy; French standard XP X30-901, Circular Economy Project Management System; ISO/TC 323 [in development Scenario 2]; ISO/AWI 59014, Secondary Materials—Principles, Sustainability and Traceability Requirements; Global Recycled Standard [a voluntary product standard for tracking and verifying content of recycled materials in a final product]; Strategic Approach to International Chemicals Management; ISO 11014:2009(en), Safety Data Sheet for Chemical Products; Energy Technology Perspectives Clean Energy Technology Guide). • Ensure that water use and conservation management plans have been developed in consultation with relevant stakeholders and implemented according to international standards and guidelines (e.g., United Nations Environment Programme International Water Quality Guidelines for Ecosystems; ISO 13.060: Water Quality).

Sector	Manufacturing
Activity	**M7. Manufacture of renewable energy technologies**
ISIC/PSIC	C2710, C2720, C3510
Description	Manufacture of components used in renewable energy technologies
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Manufacture of the following components, products, technologies, and equipment is considered eligible. Renewable energy • Manufacture of essential products, components, and machinery that support eligible renewable energy technologies promoting the development of the electricity supply sector. This also applies to the supply chain of energy generation technologies or facilities included in the energy sector of the Taxonomy (e.g., solar, wind, bioenergy). High-efficiency energy savings • Manufacture of high-efficiency energy saving household appliances such as energy-saving air conditioners, electric washing machines, other machines that comply with National Energy Efficiency and Conservation Authority energy ratings. Companies that manufacture products with a top energy efficiency rating can be considered green. • Manufacturing of high efficiency energy-saving heat pump units and modular air conditioners (see activity M9).
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	Transition to circular economy The activity adopts techniques that support: • Reuse and use of secondary raw materials and reused components in manufactured products • Design for high durability, recyclability, easy disassembly, and adaptability of manufactured products • Waste management that prioritizes recycling over disposal in the manufacturing process • Information and traceability of substances of concern throughout the lifecycle of manufactured products Pollution prevention and control • Process emissions are within emission levels associated with best available techniques and comply with applicable national – or provincial - environmental quality standards. • Use low-global warming potential refrigerants in air conditioners and refrigerators according to the Kigali Agreement to the Montreal Protocol

Sector	Manufacturing
Activity	**M8. Manufacture of low-carbon technologies for transport**
ISIC/PSIC	C2811, C29, C30
Description	Manufacture of low-carbon vehicles and their respective key components, fleets and vessels meeting the criteria set out in the Taxonomy, specifically in the transport sector
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The activity must meet any of the following criteria: • Manufacture of electric or hybrid vehicles and their components with zero or low emissions • Manufacture of zero-emission micromobility systems (e.g., hydrogen, fuel cell, electricity) • Manufacture of urban, suburban, and interurban passenger fleets with zero direct emissions (e.g., light rail, metro, tram, trolley, bus, railway) • Manufacture of vehicle fleets or rolling stock for private service transport with zero direct emissions • Manufacture of railway fleets: trains with zero direct emissions • Manufacture of inland waterway or maritime transport: electric or hybrid watercraft, based on biofuel
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	Promotion of circular economy • The activity adopts techniques that support: • Reuse and use of secondary raw materials and reused components in manufactured products • Design for high durability, recyclability, easy disassembly, and adaptability of manufactured products • Waste management that prioritises recycling over disposal in the manufacturing process • Information about and traceability of substances of concern throughout the lifecycle of manufactured products Pollution prevention and control • Where applicable, vehicles do not contain lead, mercury, hexavalent chromium, or cadmium, in accordance with national and international guidelines. For example, the End-of-Life Vehicle Directive is designed to reduce the environmental impact of vehicles by restricting use of certain hazardous substances (lead: 0.1 percent; mercury: 0.1 percent; hexavalent chromium (0.1 percent); cadmium (0.01 percent). The Handling, Manufacture, Storage, Import of Hazardous Waste and Hazardous Substances Rules, 2024 may also be referred as a regulatory framework introduced by the Pakistan Environmental Protection Agency to improve the management of hazardous substances and waste. • Emissions to air, water and soil must be prevented or minimised according to applicable national – or provincial - environmental quality standards. Refer to fuel efficiency standards, the Energy Efficiency and Conservation Action Plan, and other relevant standards for transport sector developed by NEECA, which address energy consumption and emissions in transport industry. • Use low-global warming potential refrigerants must be used in air conditioners and refrigerators according to the Kigali Agreement to the Montreal Protocol.

Sector	Manufacturing
Activity	**M9. Manufacture of energy-efficient equipment for buildings**
ISIC/PSIC	C2740, C2750
Description	Manufacture of low-carbon technologies and their key components to achieve energy efficiency in buildings, demonstrating greater reductions in GHG emissions than alternative technologies or products with better environmental performance and solutions available in the market
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Manufacture of any of these products for energy-efficient equipment in buildings and their key components is eligible, considering thresholds where applicable. • Elements of building management systems that include automation, monitoring, and control equipment and applications for temperature, energy, and water • High-efficiency windows (U-value >0.7 W/m^2K) • High-efficiency doors (U-value >1.2 W/m^2K) • Insulation products with low thermal conductivity (lambda <0.045 W/mK) • External cladding with a U-value less than 0.5 W/m^2K and roofing systems with a U-value less than 0.3 W/m^2K • Appliances with high-efficiency labels according to National Energy Efficiency and Conservation Authority energy ratings (e.g., water heaters, washing machines, electric stoves, air conditioners, cooling and heating systems) • High-efficiency lighting devices and public lighting systems using state-of-the-art light-emitting-diode lamps, following the Minimum Energy Performance Standards for Lighting developed by national energy efficiency and conservation authority. • Daylight controls for lighting system automation • Heat pumps • Facade and roofing elements with sun protection or control function, including those that support vegetation growth • Energy-efficient building automation and control systems for commercial buildings • Thermostats and zonal devices for smart monitoring of major electricity loads for residential buildings and detection equipment (e.g., motion control) • Products for heat measurement and thermostatic controls for individual homes connected to district cooling systems and individual floors connected to central cooling systems that serve an entire building
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	Promotion of circular economy • The activity adopts techniques that support: • Reuse and use of secondary raw materials and reused components in manufactured products • Design for high durability, recyclability, easy disassembly, and adaptability of manufactured products • Waste management that prioritises recycling over disposal in the manufacturing process • Information about and traceability of substances of concern throughout the lifecycle of manufactured products

Sector	Manufacturing
Activity	**M9. Manufacture of energy-efficient equipment for buildings**
DNSH Requirements	Pollution prevention and control • 100 percent of wastewater is treated in a treatment plant to dispose properly of effluent waste generated by dyeing and water recycling in the manufacturing process. Treated wastewater must meet applicable environmental standards. • End product is proven free of harmful levels of toxic substances. • Ensure that emissions to air, water and soil are prevented / minimised according to applicable national – or provincial - environmental quality standards, where applicable. • Use low-global warming potential refrigerants in air conditioners and refrigerators according to the Kigali Agreement to the Montreal Protocol [53][15]

Sector	Manufacturing
Activity	**M10. Manufacture of other low-carbon technologies**
ISIC/PSIC	N.A.
Description	Manufacture of regulated goods that meet the highest performance level for a given good in energy rating system
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Manufacturing of regulated goods, equipment and appliances that meet the highest performance level for a given good in energy rating system introduced by National Energy Efficiency and Conservation Authority energy ratings or internationally available equivalent. Lifecycle assessments must be disclosed to ensure transparency.
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	Promotion of circular economy • Reuse and use of secondary raw materials and reused components in manufactured products • Design for high durability, recyclability, easy disassembly, and adaptability of manufactured products • Waste management that prioritizes recycling over disposal in the manufacturing process • Information about and traceability of substances of concern throughout the lifecycle of manufactured products Pollution prevention and control • Use low-global warming potential refrigerants in air conditioners and refrigerators according to the Kigali Agreement to the Montreal Protocol.

15 In terms of the Kigali Amendment (2016) to the Montreal Protocol, Pakistan falls in Article 5 (Group 2) high ambient temperature countries.

Sector	Manufacturing
Activity	**M11. Manufacture of textiles**
ISIC/PSIC	C1311, C1312, C1313, C1391, C1393, C1399, C1410, C1430, C1520 The activity does not include A0163, C1420, C1511, C1512, C2826, C4641, C4751, C4771
Description	Manufacture of fabrics and garments that meet internationally recognized standards on sustainable production and manufacture
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Activity is eligible if it meets all of the following criteria. • GHG emissions less than 100g CO_2e/kWh for energy used for the manufacturing process • Input of at least 30 percent recycled material or fibres from sustainable sources (verified according to any sustainability certification such as the Better Cotton Initiative, or meeting the criteria of the agricultural sector of the Taxonomy) into final product or materials with a Higg Material Sustainability Index of less than 25 for apparel[16] Note: Sustainable textile certifications in the market: Certifications such as Global Organic Textile Standard, Oeko Tex, Waste and Resource Action Programme, and the Better Cotton Initiative that demonstrate the above technical screening criteria related to energy and material use are eligible.
Amber (Transition)	Input of at least 15 percent recycled material or fibres from sustainable sources (verified by any sustainability certification or meeting the criteria of the agricultural sector of the Taxonomy) into final product or materials with a Higg Material Sustainability Index of less than 40 for apparel[17]
Red (Ineligible)	N.A.
DNSH Requirements	The Textile and Apparel Policy of 2020-25 focuses on infrastructure development, upgrading of new technology, research and development and using the digital space for marketing and integration into global value chains, and promotes energy efficiency in small and large-scale manufacturing[18] Pollution prevention and control • 100 percent of wastewater is treated in a treatment plant to dispose properly of effluent waste generated by dyeing and water recycling in the manufacturing process. Treated wastewater must meet applicable environmental standards. If applicable, the water recycling measures and zero liquid discharge systems – ZLD – are recommended in textile processing units. (See water sector) • End product is proven free of harmful levels of toxic substances, such as by Oeko Tex Certification (Standard 100 label). • To control or reduce microplastic pollution during the fabrication phase, advanced filtration systems are installed in textile manufacturing plants to capture microplastics before wastewater is discharged. Promotion of circular economy • Establish mechanisms to ensure systems and value chains to promote repair, recovery and recycling of textiles for example through measures such as, introduction of deposit and return systems for textile products, and developing value chains for textile waste recovery (extended producer responsibility). • Promote design that enhance longevity and recyclability by creating modular clothing that can be easily repaired or upgraded or develop zero waste patterns to minimise textile waste.

16 The Higg Material Sustainability Index considers factors such as global warming, eutrophication, water scarcity, fossil fuels, and chemistry (https://howtohigg.org/higg-msi/; https://www.ifc.org/content/dam/ifc/doc/2023/strengthening-sustainability-in-the-textile-industry-ifc-2023.pdf; https://www.kymo.de/en/blog/how-sustainable-are-textiles-a-comparison-using-the-higg-material-index#most-sustainable-materials).

17 The Higg Material Sustainability Index considers factors such as global warming, eutrophication, water scarcity, fossil fuels, and chemistry (https://howtohigg.org/higg-msi/; https://www.ifc.org/content/dam/ifc/doc/2023/strengthening-sustainability-in-the-textile-industry-ifc-2023.pdf; https://www.kymo.de/en/blog/how-sustainable-are-textiles-a-comparison-using-the-higg-material-index#most-sustainable-materials).

18 Ministry of Commerce, "Textiles and Apparel Policy-2020-25,"2020. https://www.commerce.gov.pk/wp-content/uploads/2022/02/Textiles-and-Apparel-Policy-2020-25.pdf

Sector	Manufacturing
Activity	**M12. Manufacture of bricks**
ISIC/PSIC	C2392
Description	Brick kilns with substantially greater lifecycle GHG emission savings than best-performing alternative technology, product, or solution available on the market[19] [20]
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	An activity is eligible if it meets one of the following criteria: • GHG emissions depending on the type of kiln used — *Zig-zag: 83 gCO_2/kg of fired brick (20 percent lower than the baseline of Climate and Clean Air Coalition= of 103)* — *Vertical shaft brick 56 gCO_2/kg of fired brick (20 percent lower than the baseline of Climate and Clean Air Coalition=70)* • Fixed chimney Bull's trench kilns and down-draught kilns should be replaced with zig-zag, vertical shaft brick or other cleaner kiln technology. Or • Energy used for the manufacturing process has GHG emissions of less than 100g CO_2e/kWh. • Efficiency upgrade criteria — *Increase in resource or materials efficiency of 40 percent based on 2024 baseline* — *Measures that reduce direct-process GHG emissions by 40 percent based on 2024 baseline (to net zero by 2050)* Research and development related to alternative processes and technologies for manufacturing are eligible as they relate to: • New low emission kilns • Use of alternative lower carbon non-fossil fuels • Energy efficiency upgrades to zig-zag and vertical shaft kilns
Amber (Transition)	Eligible measures (until 2030) A user may use the following criteria to identify eligible capital expenditures: Fuel switching: • Replacement of coal with low-carbon alternative (e.g., low-carbon hydrogen as defined in the energy sector) • Fuel efficiency: Blending low-carbon hydrogen (as defined in the energy sector) would be a transitional step from the current natural gas economy to a future hydrogen economy. • Preparation and use of refuse-derived fuel Process: • Installation of infrastructure to use the following as substitute for raw materials — *Non-recyclable solid waste* — *Fly ash* — *Waste glass powder*

19 It is estimated that 82.5 billion fired bricks were produced in 2018 in various sorts of kilns using various types of fuels and fuel mixes such as indigenously produced lignite coal, rice husks and other agricultural residue, rubber tires, plastics, and industrial waste that produce highly toxic gases. It is estimated that 13 tons of coal are consumed for firing bricks, with coal fulfilling 70 percent of energy needs, and biomass fulfilling 30 percent. There are an estimated 18,000 to 20,000 brick kilns in Pakistan, most of which use fixed chimney Bull's trench kiln technology; 150 use zig-zag technology. Zig-zag kilns have been given significant importance in the context of NDCs, meaning that this technology has been proven to reduce GHG emissions, so it supports the compliance of the NDCs and made part of the National Action Plan for Sustainable Energy for All [55].

20 Approximately 46 million bricks are produced per year in Pakistan in more than 6,000 brick kilns. Approximately 533,019 tons of untreated GHGs are emitted from these annually [55].

Sector	Manufacturing
Activity	**M12. Manufacture of bricks**
Amber (Transition)	• Leakage prevention systems in existing natural gas transmission and distribution lines in bricks kilns industries. • Retrofitting of transmission and distribution lines of power and natural gas utilities in existing brick kilns industries. • Waste heat recovery: Installation of systems that recover and reuse the heat from exhaust gases to preheat raw materials or air entering the kiln. • Energy efficiency measures that demonstrate savings of at least 30% of the energy used in the brick manufacturing process (e.g., insulation, efficient firing technology and optimisation of kiln design to maximise heat use, energy consumption, and consumption and reduce emissions).
Red (Ineligible)	Facilities or measures in which: • The energy source is 100 percent coal or other fossil fuel and there is no transition plan to switch to a sustainable energy source. • Coal is used for on-site electricity generation
DNSH Requirements	Pollution prevention and control • The project complies with the national environmental quality standards (with a maximum allowable concentration for 16 parameters (pollutants) in gaseous emissions from industrial sources). Promotion of circular economy • At least 20 percent of the input material comes from recycled materials such as p lastic waste, fly ash waste, and waste glass powder.

Sector	Manufacturing
Activity	**M13. Research and development and professional services**
ISIC/PSIC	N.A.
Description	Research, development and innovation activities in the manufacturing sector that reduce the environmental impact of the economic sector
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Creation of intangible assets, research, development, and innovation activities to promote compliance with the substantial contribution criteria of the Taxonomy sectors; including research, development, and innovation for CCS-related technologies, including direct air capture in the manufacturing sector.
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	N.A.

Sector	Manufacturing
Activity	**M14. General guidance for other manufacturing industries**
ISIC/PSIC	N.A.
Description	For industries that do not have a specific activity within the Taxonomy, compliance with climate change mitigation objectives is assessed by analysing use of funds for the specific activity under evaluation.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Although energy efficiency is a technological intervention and constitutes improvement in energy performance or reduction in energy consumption, it does not necessarily indicate a substantial contribution to climate change mitigation. Therefore, it is crucial to verify whether measures designed to increase energy efficiency substantially improve the performance of an activity (e.g., assessment of changing machinery to technologies with lower emissions or energy consumption). The Taxonomy addresses the concept of energy efficiency through the substantial contribution criteria for activities in various sectors. An activity considered to be an energy efficiency measure must demonstrate that overall performance levels in terms of energy intensity or carbon intensity achieved by using such measures are within the limits established under the technical substantial contribution criteria. Energy efficiency measures in activities that hinder the Taxonomy's objectives are not eligible (e.g., energy-efficiency measures applied to machinery that generate energy from fossil fuels). Activities of some industries in the sector are listed below, along with the impacts they have on renewable and non-renewable resources, their contribution to energy or carbon intensity, and their relationship with other productive sectors of the Taxonomy. Food and beverage industry Examples of associated impacts • Impacts on raw material acquisition (subject to type of manufacturing) • Impacts related to high emissions generation and energy consumption in food manufacturing processes (acquisition of raw materials for subsequent treatment, processing, preparation, preservation, packaging, transport) • Discharge into water bodies and odour generation in industrial processes Related sectors under the Taxonomy • Raw material acquisition may base its procurement criteria on the agricultural, forestry, aquaculture and fishing sectors of the Taxonomy. • Energy used in the facility must comply with requirements stipulated in the electricity, gas, steam, and air conditioning supply sector (100 gCO_2e/kWh or use of renewable sources). • Discharges resulting from industrial processes in food manufacturing must comply with the criteria of the corresponding activities under the water sector. • Vehicles used for transport must comply with the criteria established for corresponding activities in the transport sector. Paper and cardboard Examples of associated Impacts • Impacts on raw material acquisition (subject to type of manufacturing) • Impacts related to high emissions generation and energy consumption in food manufacturing processes (acquisition of raw materials for subsequent treatment, processing, preparation, preservation, packaging, and transport) • High water consumption • Discharge into water bodies and odor generation in industrial processes

Sector	Manufacturing
Activity	**M14. General guidance for other manufacturing industries**
Green	Related sectors under the Taxonomy • For virgin raw materials, refer to practices defined in the forestry sector. • When using recovered materials in manufacturing, refer to requirements of waste management sector. • Energy used in the facility must comply with requirements stipulated in the electricity, gas, steam, and air conditioning supply sector (100 gCO_2e/kWh or use of renewable sources). • Water management and treatment must comply with criteria established in water supply and treatment sector. • Discharge resulting from industrial processes in food manufacturing must comply with criteria of water supply and treatment sector (wastewater and sewage).
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	N.A.

Sector	Manufacturing
Activity	**M15. Carbon capture, utilisation, and storage (CCUS), including transport**
ISIC/PSIC	N.A.
Description	CCUS technology is a set of technological processes with the purpose of reducing carbon emissions in the atmosphere, capturing the CO_2 generated on a large scale. This activity relates to the capture of CO_2 from a point source in an industrial facility. Captured CO_2 may be transported and stored or used on-site by industrial processes that require a source of carbon.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The activity complies with all of the following criteria: • Point capture of CO_2 is eligible only as a complementary activity for activities in the manufacturing sector of the Taxonomy, as long as it guarantees capture of at least 90 percent of the CO_2 emissions generated in the industrial process. • Avoided emissions from direct CO_2 capture cannot be counted towards meeting the threshold of the economic activity in the Taxonomy • The company has a carbon neutrality or decarbonisation plan in place. • For storage, operation of a permanent CO_2 storage facility is directly eligible if the facility meets the criteria of ISO 27914:2017 (CO_2 capture, transport geological storage), including other standards that are relevant to CO_2 storage, such as: — *ISO 14064 Series (Greenhouse Gas Accounting and Verification): These standards are used to ensure transparency and accuracy in accounting for and verifying CO_2e emissions reductions, being essential for CO_2e storage projects.* — *ISO 13903:2015 (Carbon Dioxide Vocabulary): Defines terms and concepts used in CO_2 storage, ensuring clarity in terminology for industry professionals.*

Sector	Manufacturing
Activity	**M15. Carbon capture, utilisation, and storage (CCUS), including transport**
Green	For CO_2 transport, permanent capture sites are eligible if the asset operates below the leakage threshold per tonne of CO_2e described below: • The leakage per tonne of CO_2 transported from the head-end(s) of the transport network to the injection point(s) is less than 0.5 percent, and the GHG is delivered to a taxonomy-eligible activity. • Have a monitoring plan and leak control systems, in line with current regulations.
Amber (Transition)	N.A.
Red (Ineligible)	CCUS technology in oil and gas industries
DNSH Requirements	Pollution prevention and control: • Avoid hazardous waste from amine solvent and carbon use in CCUS, particularly in the amine scrubbing process for CO_2 capture, by maintaining proper solvent concentration (regularly monitor and adjust concentration of amine solvents) and using solvent regeneration techniques to reduce the need for fresh amine solvent. • Minimise the formation of secondary aerosols and production of tropospheric ozone by using low-emission solvents (e.g., using advanced amine-based or ionic liquids) to minimise volatile organic compounds, using leak detection and repair technologies, reducing precursor emissions, optimising process conditions such that NOx, volatile organic compounds, and particulate emissions are minimised.

Transport

GHG emissions from the transport sector account for 9.8 percent of total CO_2e emissions in the country. Of these emissions, 68 percent are associated with cars and light trucks, including both vehicles equipped with catalytic converters and those without [54] [41]. Transport also has a direct impact on air quality, especially in urban areas. In 2022/23, the transport and storage sector contributed 5.3 percent of the country's GDP [52].

Pakistan's most recent Biennial Update Report of 2024 highlights that managing or curbing emissions growth in the transport sector is one of the most important challenges to overall mitigation efforts and is essential for addressing climate change. To tackle this issue, the government has implemented mass transit programmes in major cities such as Islamabad, Karachi, Lahore, and Peshawar. These programmes not only provide public transport facilities but are also designed to reduce GHG emissions [55].

The activities within this sector are listed below.

Activity	ISIC/PSIC Code
T1. Public transport in urban and rural areas (passenger)	H4921, H4911
T2. Micromobility (other passenger land transport)	H4922
T3. Interurban transport (cargo and passengers)	H4921
T4. Low-carbon transport infrastructure	H52
T5. Sea and coastal water transport (cargo and passengers)	H501
T6. Inland water transport (cargo and passengers)	H502

Activity	ISIC/PSIC Code
T7. Freight and passenger air transport	H5110, H5120, H51
T8. Transport by passenger cars and light commercial vehicles	H4922
T9. Research and development—professional services	N.A.

Technical screening criteria for the activities are listed below.

Sector	Transport
Activity	**T1. Public transport in urban and rural areas (passengers)**
ISIC/PSIC	H4921, H4911
Description	Public transport is a comprehensive system of different modes of transport, including buses, taxis, bicycles, trams, trolleys, trains and water vehicles. Given that the transport sector is an important source of GHG emissions, including CO_2, methane, nitrogen oxides, it is essential to adopt sustainable systems that integrate with urban structures to transport large numbers of passengers efficiently; this necessitates the expansion of low- or zero-emission vehicles and alignment with decarbonisation and sustainable mobility plans to reduce environmental impact.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The activity must meet one of the following criteria: • Vehicle fleets for urban public transport by land, rail, funicular or cable car, river or sea with zero direct emissions (e.g. electric or powered by low-carbon hydrogen) — *Examples of urban land or rail public transport fleet: rapid transit buses, intermediate or feeder buses, light trains, subways, trams, trolleys, commuter or suburban trains, taxis, shared private vehicles, ride-sharing systems* — *Examples of river or maritime transport fleet: ferries, water taxis* • Vehicle fleets for passenger transport that use sustainable biofuels and biomethane, guaranteed by technological design or by continuous monitoring and verification by third parties to meet criteria for substantial contribution. Ensure use of transport technologies that allow use of B100 (biofuel). Note 1: It is essential that production and use of biofuels does not compromise food security or energy availability. Note 2: Retrofitting or modifying the fleet's propulsion system meets the criteria of substantial contribution if it meets the emission threshold or if the vehicles are transformed into ones with zero direct emissions.
Amber (Transition)	Land public transport • Direct emissions less than 20 gCO_2e/passenger-km until the end of 2030, aligned with the national target that 30 percent of new vehicles in 2030 should be electric • Diesel-hybrid buses with a minimum 20 percent greater efficiency than conventional diesel buses until the end of 2030 Water transport • Until December 31, 2030, hybrid and double-fuel ships that use at least 50 percent of their fuel energy from zero direct emissions sources (measured in the exhaust pipe) or plug-in energy for normal operation.
Red (Ineligible)	N.A.

Sector	Transport
Activity	**T1. Public transport in urban and rural areas (passengers)**
DNSH Requirements	Sustainable use and protection of water resources • Vehicles must be cleaned at sites designated for this task, making rational use of water resources and avoiding wastewater discharge that does not comply with environmental permits and authorisations. Promotion of circular economy • For battery-powered transport, these measures include reuse and recycling of batteries and electronic components, including the critical raw materials they contain. • There must be a management plan that allows use and reuse of the fleet that is out of circulation, in compliance with the corresponding regulations regarding the circular economy and solid waste management. The disused fleet must be disassembled in compliance with environmental regulations such as the Hong Kong Convention, which Pakistan ratified for the dismantling of ships. • Certificates of final disposal of solid waste must be generated throughout the management process of disused vehicles, detailing the type of treatment provided according to the type of waste. • In the maintenance and management of vehicles the end of their lifespan (dismantling), ensure compliance with current national legislation on generation, management, and treatment of hazardous waste. Pollution prevention and control • Vehicles must comply with permissible limits for emissions (unburned hydrocarbons, CO, CO_2), and opacity for combustion engine vehicles. • In addition to meeting the target for direct CO_2 emissions, vehicles must meet standards that the (PEPA), 1997 set on permissible limits for pollutants emitted by motor vehicles, such as CO, hydrocarbons, NOx, and particulate matter. • In relation to direct emissions to the air from exhaust gases of internal combustion engines (NOx, total hydrocarbons, hydrocarbons other than methane, CO, material particulate matter), buses must comply with the current Euro V standard or higher. • If there is no standard regarding maximum permitted noise levels, the vehicles must comply with one of these international standards: — *ISO 13.040.50: Emissions from mobile sources* — *ISO 362: Measurement of noise emitted by road vehicles during acceleration* — *ISO 28580:2018: - Method of measuring rolling resistance of tires for passenger cars, trucks, and buses*

Sector	Transport
Activity	**T2. Micromobility (other land transport)**
ISIC/PSIC	H4922
Description	Micromobility refers to transport in small, light vehicles that usually operate at speeds of less than 25 km/h and are ideal for trips of up to 10 km [56]. They can be human or electric powered and be used individually or shared by several people. Current micromobility solutions include mopeds, bicycles, skateboards, hoverboards, roller skates, e-scooters, e-skateboards, gyroboards, and other small means of transport, which are normally electric and, because of their technical, functional, and environmental characteristics, are good candidates for environmentally sustainable transport solutions.
Environmental Objective	Climate change mitigation

Sector	Transport
Activity	**T2. Micromobility (other land transport)**
Methodology	Criteria
Green	Any freight or passenger micromobility fleet or system that has direct zero emissions are directly eligible.
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	Promotion of circular economy • Ensure that measures have been implemented to manage waste according to type during the use phase (maintenance) and at the end of the fleet's life, including reuse and recycling of batteries and electronic devices (especially critical raw materials that they contain).

Sector	Transport
Activity	**T3. Interurban transport (cargo and passengers)**
ISIC/PSIC	H4921
Description	Interurban transport refers to movement of goods or passengers between urban centres.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Interurban transport is eligible if it meets one of the following criteria. • The fleet of vehicles or rolling stock intended for intermunicipal transport, whether for cargo or passengers, for road and rail transport, has zero direct emissions. • The fleet consists of vehicles or rolling stock, whether for cargo or passengers, that use sustainable biofuels and biogas, whose use is guaranteed by technological design or by continuous monitoring and third-party verification. Vehicles that allow for the use of 100 percent biofuels are automatically eligible.
Amber (Transition)	• By 2030, any fleet of vehicles intended for interurban transport, whether for cargo or passengers, that are hybrid are eligible. Diesel hybrids must demonstrate at least 20 percent lower CO_2 emissions than conventional diesel vehicles. The target of 30 percent electric vehicles is set at the national policy level. • Vehicles that allow for use of biofuel mixture of any percentage until 2030 are eligible, after which vehicles must meet the green criteria.
Red (Ineligible)	Vehicles or rolling stock based on fossil fuels or fossil fuel blends with alternative fuels and vehicles transporting such fuels are not eligible.
DNSH Requirements	Pollution prevention and control • Maintenance and end-of-life management of vehicles must comply with regulations on integrated waste or hazardous waste management. • Activities must comply with permissible limits for air emissions (unburned hydrocarbons, CO, CO_2, opacity) for combustion motor vehicles according to applicable local regulations. • For commercial vehicles, a load test must be conducted on a chassis dynamometer. • Regarding direct emissions to the air from internal combustion engines (NOx, total hydrocarbons, non-methane hydrocarbons, CO, particulate matter), vehicles must comply with the current Euro V standard or higher.

Sector	Transport
Activity	**T3. Interurban transport (cargo and passengers)**
DNSH Requirements	Promotion of circular economy • Measures must be implemented to manage waste according to type during the use phase (maintenance) and at the end of the fleet's life, including reuse and recycling of batteries and electronic devices (especially critical raw materials that they contain).

Sector	Transport
Activity	**T4. Low-carbon transport infrastructure**
ISIC/PSIC	H52
Description	This activity includes infrastructure, machinery, and equipment designed to promote sustainable modes of transport and computer equipment for providing control services and maintenance facilities. Low-carbon transport infrastructure produces less CO_2 than traditional alternatives and supports sustainable, efficient travel. Actions such as constructing, rehabilitating, operating, and maintaining such infrastructure are essential for promoting sustainability. To be truly effective, sustainable infrastructure should be climate resilient, socially inclusive, technologically advanced, productive, and adaptable.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The following activities are eligible: • Infrastructure required for zero-emission transport (e.g., electric charging points, upgrades to the electric grid connection, hydrogen fuelling stations, electric highways). • Infrastructure, machinery, and equipment (including fleets) for active micromobility (e.g., pedestrian, bicycle, scooters), for example, redesigned road profiles to increase pedestrian areas and bike lanes, micromobility systems in general, urban equipment for public shared micromobility system stations, consolidation points and urban distribution of last-mile goods in micromobility systems and (cross-docking, secure parking for micromobility at public transport stations), if the vehicle fleet or modes of transport using the infrastructure meet the thresholds for direct emissions as defined in activity T2. • Infrastructure, machinery, and equipment required to upgrade existing facilities or vehicles to ensure compliance with stricter emissions standards (e.g., upgrading engines, replacing parts to adapt to low carbon fuels) • Non-electrified railway infrastructure with an existing plan for electrification or use of trains with alternative engines • Multimodal logistics infrastructure: infrastructure for low-carbon logistics and freight transport with development of logistics consolidation and distribution centres, and infrastructure for low-emission logistics corridors (e.g., rail and waterway corridors) and logistics platforms that connect road, rail, and waterway, supporting efficiency in freight transport and reducing GHG emissions • Infrastructure for the supply of sustainable biofuels and green hydrogen • Technological infrastructure and platforms for mobility as a service in cargo and passenger transport • Maintenance and repair of low-emission vehicles that meet the energy criteria under the Taxonomy (e.g., electric, hydrogen, hybrid)
Amber (Transition)	N.A.
Red (Ineligible)	Infrastructure dedicated to transport of fossil fuels or blended fossil fuels is not eligible.

Sector	Transport
Activity	**T4. Low-carbon transport infrastructure**
DNSH Requirements	Promotion of circular economy • Ensure reuse of parts and recycled materials during renovation, improvement, and construction of infrastructure • Ensure that at least 20 percent (by weight) of non-hazardous construction and demolition waste generated on site is prepared for reuse, recycling, and other types of material recovery. Rates should increase to 40 percent by 2025, 60 percent by 2028, and 70 percent by 2030. • Establish a circular economy plan that demonstrates prioritisation of use of low-carbon or sustainable materials. Pollution prevention and control • Minimising noise and vibrations caused by the use of infrastructure (e.g., open trenches and wall barriers) Sustainable use and protection of biodiversity and ecosystems • Avoid fragmentation and degradation of natural and urban landscapes and risks of road incidents or accidents and wildlife accidents caused by collisions • Prevent harm to aquatic ecosystems caused by tunnels that may change and degrade hydro-morphological conditions of water bodies • Monitor and protect urban ecosystems, particularly public spaces, urban green areas, and urban tree cover

Sector	Transport
Activity	**T5. Sea and coastal water transport (cargo and passengers)**
ISIC/PSIC	H501
Description	Sea and coastal transport are used to move cargo and passengers and can be national and international. The purpose of the activity is to demonstrate a substantial reduction in GHG emissions.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Maritime transport is eligible if it meets any of the following requirements. • Zero-direct-emission vessels are directly eligible, (including cargo and passenger vessels with kite technology or based on wind power propulsion) • Vessels using alternative fuels such as green hydrogen (meeting the Taxonomy threshold), including its derivatives such as green ammonia, methanol, and biogas or biofuels, whose use is guaranteed by technological design or continuous monitoring and verification by third parties, are eligible. • Auxiliary vehicles for maritime transport with zero direct CO_2 emissions or alternative fuels such as green hydrogen (meeting the Taxonomy threshold), including its derivatives such as green ammonia, methanol, and biogas or biofuels, guaranteed by technological design or continuous monitoring and verification by third parties. International maritime transport vessels must meet the following criteria when applicable. • The provisions of Chapter 4 of Annex VI of the International Convention for the Prevention of Pollution from Ships of the International Maritime Organization. That annex defines the rules for reducing the carbon intensity of international maritime transport and advancing toward the levels of ambition established in the International Maritime Organisation Initial Strategy on the Reduction of Greenhouse Gas Emissions from Ships (improving the performance).

Sector	Transport
Activity	**T5. Sea and coastal water transport (cargo and passengers)**
Green	— *The Projected Energy Efficiency Index and Applicable Energy Efficiency Existing Ship Index must be calculated for new ships, existing ships, and those that have undergone significant modifications in accordance with International Maritime Organization guidelines.* — *New and existing ships must carry on board a ship energy-efficiency management plan that establishes a mechanism for increasing energy efficiency using operational measures.* — *All ship operators with a gross tonnage of 5,000 tons or more must collect and report data on fuel consumption in accordance with Appendix IX of Annex VI of the International Convention for the Prevention of Pollution from Ships.* Note: All ships with a gross tonnage of 5,000 tonnes or more must calculate annual operational carbon intensity and, when required, formulate a plan for corrective measures, considering International Maritime Organization guidelines [57].
Amber (Transition)	River vessels are eligible if direct emissions (measured at the exhaust pipe) of grams of CO_2 per tonne-kilometre, calculated (or estimated in the case of new ships) using the Energy Efficiency Operational Index, are 50 percent lower than the reference average value for CO_2 emissions defined for heavy-duty vehicles. This alternative is optional when it is not technologically and economically feasible to meet the green criteria and will be allowed until December 31, 2030.
Red (Ineligible)	Vessels dedicated to transport of fossil fuels are not eligible.
DNSH Requirements	Promotion of circular economy • Define measures to manage waste in the use phase and at the end of the vessel's life according to the waste hierarchy, including control and management of hazardous materials on board vessels and ensuring their safe recycling. • Establish a management plan that allows use and reuse of the fleet that is out of circulation, in compliance with corresponding national regulations regarding circular economy and solid waste management. Disassembly of the disused fleet must comply with standards of the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, which Pakistan ratified in 2023. • For ships powered by batteries, define measures to include reuse and recycling of batteries and electronic components, including critical raw materials they contain. Pollution prevention and control • Vessels must comply with emission limits established in related regulations. • Ships operating with marine diesel engines must comply with certifications and recognitions that ensure that they do not pollute the atmosphere. • All deliberate emissions of substances that deplete the ozone layer are prohibited, as well as ships containing substances that deplete the ozone layer. • Ships with systems or equipment containing substances that deplete the ozone layer must have an International Air Pollution Prevention Certificate and maintain a record of such substances. • Apply a control strategy of sulphur oxide and particulate matter emissions from fuel oil used or transported for use on board the ship. Control measures include procedures for fuel oil change, fuel oil sampling, and sulphur content control, which must have a limit of 0.50 percent mass by mass (m/m). • At points and terminals (docks, ports, harbours) defined by local regulations, tankers, gas carriers, and crude oil–carrying ships must implement a volatile organic compounds management plan that the appropriate authority has approved. • For NOx emissions, vessels comply with Regulation 13 of Annex VI to International Maritime Organisation (IMO) International Convention for the Prevention of Pollution from Ships (MARPOL). Tier II NOx requirement applies to ships constructed after 2011. Only while operating in NOx emission control areas established under IMO rules, ships constructed after 1 January 2016 comply with stricter engine requirements (Tier III) reducing NOx emissions. • Discharges of black and grey water must comply with Annex IV to the IMO MARPOL Convention

Sector	Transport
Activity	**T6. Inland water transport (cargo and passengers)**
ISIC/PSIC	H502
Description	Transport of passengers, freight, or cargo via rivers, canals, lakes, and other inland waterways, including inside harbours and ports. Rental of pleasure boats with crew for inland water transport.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Inland transport is eligible provided it meets any of the following requirements. • Vessels that have zero direct tailpipe CO_2 emissions • Vessels using alternative fuels such as green hydrogen (meeting the Taxonomy threshold), including its derivatives such as green ammonia, methanol, and biogas or biofuels, guaranteed by technological design or continuous monitoring and verification by third parties
Amber (Transition)	For freight inland water transport • Until 2030, vessels with direct tailpipe emissions do not exceed 28.3 g of CO_2 per tonne-kilometre.
Red (Ineligible)	Vessels dedicated to fossil fuel transport are not eligible.
DNSH Requirements	Promotion of circular economy • Define measures to manage waste in the use phase and at the end of the vessel's life according to the waste hierarchy, including control and management of hazardous materials on board vessels and ensuring their safe recycling. • Establish a management plan that allows use and reuse of the fleet that leaves circulation in compliance with the corresponding national regulations regarding circular economy and solid waste management. Disassembly of the disused fleet must comply with standards of the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, which Pakistan ratified in 2023. • For ships powered by batteries, these measures include reuse and recycling of batteries and electronic components, including critical raw materials they contain. Pollution prevention and control • Ships operating with marine diesel engines must comply with certifications and recognitions that ensure that they do not pollute the atmosphere. • All emissions of substances that deplete the ozone layer are prohibited, as well as ships containing substances that deplete the ozone layer. • Ensure control of sulphur oxide and particulate matter emissions from fuel oil used or transported for use on board the ship. Control measures include procedures for fuel oil change, fuel oil sampling, and sulphur content control, which must have a limit of 0.50 percent m/m. • At points and terminals (docks, ports, harbours) defined by local regulations, tankers, gas carriers, and crude oil–carrying ships must carry and implement a volatile organic compound management plan that the appropriate authority has approved. • As regards NOx emissions, vessels must comply with Regulation 13 of Annex VI to IMO MARPOL Convention. Tier II NOx requirement applies to ships constructed after 2011. Only while operating in NOx emission control areas established under IMO rules, ships constructed after January 1, 2016, must comply with stricter engine requirements (Tier III) reducing NOx emissions. • Discharges of black and grey water must comply with Annex IV to the IMO MARPOL Convention.

Sector	Transport
Activity	**T7. Freight and passenger air transport**
ISIC/PSIC	H5110, H5120, H51
Description	Passenger air transport • Transport of passengers by air over regular routes and on regular schedules, charter flights for passengers, and scenic and sightseeing flights • Renting of air transport equipment with operator for the purpose of passenger transport and general aviation activities such as transport of passengers by aero clubs for instruction or pleasure Freight air transport • Transport of freight by air over regular routes and on regular schedules, non-scheduled transport of freight by air, launching of satellites and space vehicles, space transport • Renting air transport equipment with operator for the purpose of freight transport • Vehicles and equipment that support ground activities in airports
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Once the International Civil Aviation Organisation develops a credible, science-based, 1.5°C-aligned pathway, it will be reviewed for inclusion in the Taxonomy. Pending this development, the activity complies with the following criterion. • Zero-exhaust CO_2-emission aircraft such as those powered by electricity or hydrogen meeting the Taxonomy criteria
Amber (Transition)	The amber activity meets one of the following criteria: • Purchase or use of sustainable aviation fuel (SAF) makes a substantial contribution if it is used in the processes. • Investments in manufacturing, infrastructure, and supply chains for development of the SAF industry and activities that promote production and adoption of SAF can be classified as Amber measures. • Manufacturing, infrastructure, and supply chains for development of the SAF industry can be classified as Amber only if they relate to SAFs that meet the feedstock criteria. SAF feedstock • The International Civil Aviation Organisation must recognize SAF feedstock as eligible under the Carbon Offsetting and Reduction Scheme for International Aviation or certified under European Union Renewable Energy Directive 36. The following additional measures for accomplishing the Long-Term Aspirational Goal for International Aviation Emissions Reductions of the International Civil Aviation Organisation, which is designed to achieve net-zero carbon emissions from international aviation by 2050, are also eligible: • Implement air traffic management and operational efficiency measures, such as efficient routing, optimised flight paths, shorter wait times, better aircraft scheduling, and better operational practices that reduce fuel consumption and emissions. • Market based measures whereby carbon emitted (only for fuel consumption) is offset through projects that meet the International Civil Aviation Organisation Carbon Offsetting and Reduction Scheme for International Aviation Eligible Emissions Unit criteria. These criteria must be accompanied by a decarbonisation plan for the aviation company that demonstrates credible plans for use of SAF or other alternate fuels after the sunset date for the Amber criteria of 2030. • Technology improvements: development of more fuel-efficient engines, lightweight materials and aerodynamically optimised aircraft designs that demonstrate a significant long-term emissions reduction in aviation.

Sector	Transport
Activity	**T7. Freight and passenger air transport**
Amber (Transition)	Note 1: Requirements for Amber measures must be revised by 2030 to reflect the most recent developments in SAF technologies and their potential impact on decarbonization of aviation. Note 2: The criteria will be revised before 2030 when a credible, science-based, 1.5°C-aligned pathway for SAF blending has been developed (e.g. by the International Civil Aviation Organisation).
Red (Ineligible)	Air transport that uses 100 percent fossil fuels
DNSH Requirements	Pollution prevention and control • A waste management plan must be in place to avoid waste generation in the use phase (maintenance, operation of air transport services) and manage any remaining waste in accordance with the waste hierarchy. • Measures must be in place to manage and recycle waste at the end-of life of the fleet, including through decommissioning contractual agreements with aircraft recycling service providers.

Sector	Transport
Activity	**T8. Transport by passenger cars and light commercial vehicles**
ISIC/PSIC	H4922
Description	Private transport vehicles or vessels with zero direct emissions (e.g., electricity or low-carbon hydrogen) are directly eligible.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Light transport vehicles with zero direct (tailpipe) emissions.
Amber (Transition)	Plug-in hybrid vehicles are eligible until 2030
Red (Ineligible)	Vehicles that do not meet Green or Amber criteria.
DNSH Requirements	Pollution prevention and control • Regarding air and noise pollution, private transport vehicles must comply with the policies incorporated in the World Forum for Harmonization of Vehicle Regulations of WP.29. • Hybrid vehicles must comply with permissible limits for air emissions (unburned hydrocarbons, CO, CO_2, opacity) for combustion motor vehicles according to applicable local regulations. Promotion of circular economy • Ensure that measures have been taken to manage waste according to type during the use phase (maintenance) and at the end of the fleet's life, including reuse and recycling of batteries and electronic devices (especially critical raw materials that they contain).

Sector	Transport
Activity	**T9. Research and development—professional services**
ISIC/PSIC	N.A.
Description	Research, development, and innovation in the transport sector that reduce the environmental impact of the sector
Environmental Objective	Climate change mitigation

Sector	Transport
Activity	**T9. Research and development—professional services**
Methodology	Criteria
Green	Creation of intangible assets and research, development, and innovation activities that promote compliance with the substantial contribution criteria of the Taxonomy in the transport sector are directly eligible. Some intangible assets and research, development, and innovation activities that enable substantial contribution to climate change mitigation are: • Supervisory control and data acquisition systems that track energy use at the component or equipment level to increase energy efficiency and enable zero-emission vehicles • Innovation in charging infrastructure for zero-emission vehicles • Innovation in infrastructure and asset management [58] — *Smart infrastructure: Developing intelligent transport systems that use data analytics and the Internet of Things to optimise traffic flow and reduce congestion* — *Maintenance and sectorisation: Implementing predictive maintenance using artificial intelligence and machine learning to extend the lifespan of infrastructure and reduce downtime* • Alternative fuels technology that enables zero-emission vehicles • Advanced batteries and efficient motors that enable zero-emission vehicles.
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	N.A.

Energy

GHG emissions from the energy sector primarily arise from the combustion of fossil fuels for electricity generation, accounting for 98.3 percent of the total emissions, with petroleum refining contributing the remaining 1.7 percent. Increasing energy generation through renewable sources is a high priority for Pakistan, aimed at addressing the national supply deficit. According to the International Energy Agency's 2021 report, to align with a 1.5°C scenario, approximately 100 GW of coal-fired plants must be phased out globally from 2021 to 2030 [59].

Achieving this level of ambition poses a significant challenge for many countries, as coal retirement pledges often pertain to plants that operate at or near the end of their operational life, are already sitting idle, or are long overdue for decommissioning. The difficulty lies in aligning the ambition of the 1.5°C target of the Paris Agreement with a strategy to expedite the decommissioning and retirement of plants that still have a substantial remaining operational lifetime and remain economically viable, often due to long-term contract commitments.

The National Transmission and Despatch Company Limited has prepared the Indicative Generation Capacity Expansion Plan for 2024-2034 and submitted it to the National Electric Power Regulatory Authority for approval. It is anticipated that carbon emissions from power generation will decrease from 340 g-CO_2/kWh in fiscal 2024 to 209 g-CO_2/kWh by fiscal 2034. The National Electricity Policy and National Electricity Plan set a target for renewable energy-based generation, including hydropower, to constitute 60 percent share of the energy mix by 2030.

The National Electricity Policy and National Electricity Plan lay out the long-term vision and plan for decarbonisation in the power sector, requiring a shift from thermal dominant to renewable energy dominant. Pakistan has outlined several initiatives to reduce the carbon footprint of its electricity sector. An increase in grid flexibility through technological interventions, automation, and enhanced forecasting capabilities at the national energy distribution grid is promoted in the country. The National Electricity Plan 2023 provides guidelines, implementation mechanisms, and tools for realization of the National Electricity Policy goals for the power sector. The plan also sets the target of 60 percent share of renewable energy–based generation, including hydropower, by 2030.

To decarbonise electricity generation, it is essential to enhance the efficiency of energy produced from fossil fuels and decrease reliance on them during the transition period, while simultaneously developing and expanding the adoption of low-carbon energy sources. The proposed activities aim to reduce direct emissions while ensuring the reliability of the energy grid at affordable electricity prices.

The activities within this sector are listed below.

Activity	ISIC/PSIC Code
E1. Energy from solar photovoltaic and concentrated solar power (including electricity, heating, cooling)	D3510
E2. Electricity generation from wind power	D3510
E3. Electricity generation from hydropower	D3510
E4. Geothermal energy generation (including electricity, heating, cooling)	D3510
E5. Bioenergy power generation (including electricity, heating, cooling)	D3510
E6. Electricity generation from ocean energy	D3510
E7. Electricity generation from hydrogen or its derivatives (e.g., ammonia)	D3510
E8. Transmission and distribution of electricity	D3510
E9. Transmission and distribution of renewable and low-carbon gases	D3520
E10. Energy storage	D3510
E11. Low-carbon hydrogen production	N.A.
E12. Production of heating and cooling using waste heat	D3530
E13. District heating and cooling systems	D3530
E14. Research and development—professional services	N.A.

Technical screening criteria for the activities are listed below.

Sector	Energy
Activity	**E1. Energy from solar photovoltaic and concentrated solar power (including electricity, heating, cooling)**
ISIC/PSIC	D3510
Description	This class includes generation of bulk electric power, transmission from generating facilities to distribution centres, and distribution to end users and power generation as part of cogeneration. This class includes: • Operation of generation facilities that produce electricity, including thermal, nuclear, hydroelectric, gas turbine, diesel, and renewable • Operation of transmission systems that convey electricity from the generation facility to the distribution system • Operation of distribution systems (lines, poles, meters, wiring) that convey electricity received from the generation facility or the transmission system to the final consumer • Sale of electricity to users

Sector	Energy
Activity	**E1. Energy from solar photovoltaic and concentrated solar power (including electricity, heating, cooling)**
Description	• Activities of electric power brokers or agents that arrange the sale of electricity via power distribution systems operated by others • Operation of electricity and transmission capacity exchanges for electric power • Off-grid renewable energy solutions and decentralized grids for energy equity.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	All energy generation and cogeneration activities from solar photovoltaic and concentrated solar power are directly eligible. Hybrid solar and wind power plants and floating solar panels are also included in this activity.
Amber (Transition)	N.A.
Red (Ineligible)	Power plants dedicated to supporting fossil fuel infrastructure (e.g., operations of fossil fuel activities) are ineligible.
DNSH Requirements	Promotion of circular economy • Verify through a project management plan or technology datasheets, photovoltaic panels and associated components have been designed and manufactured for durability and ease of disassembly, reconditioning, and recycling. • Verify that hazardous and non-hazardous waste management plans are in place according to the scale of the project, including proper management of waste from replacement and operation of panels (electric and electronic waste), prioritising recycling of those with potential for use and proper management of those classified as hazardous waste (in accordance with waste sector W1. Collection and transport of non-hazardous waste). • Solar photovoltaic modules must be certified under UL1703/UL61730—Photovoltaic Module Safety Standards or an equivalent certification. Sustainable use and protection of water resources • Establish a plan that involves water resource management actions to promote efficient use of water, especially when cleaning the panels.

Sector	Energy
Activity	**E2. Electricity generation from wind power**
ISIC/PSIC	D3510
Description	This class includes: • Generation of bulk electric power, transmission from generating facilities to distribution centres, and distribution to end users and power generation as part of cogeneration. • Operation of generation facilities that produce electricity, including thermal, nuclear, hydroelectric, gas turbine, diesel, and renewable • Operation of transmission systems that convey electricity from the generation facility to the distribution system • Operation of distribution systems (lines, poles, meters, wiring) that convey electricity received from the generation facility or the transmission system to the final consumer • Sale of electricity to the user • Activities of electric power brokers or agents that arrange the sale of electricity via power distribution systems operated by others

Sector	Energy
Activity	**E2. Electricity generation from wind power**
Description	• Operation of electricity and transmission capacity exchanges for electric power • Off-grid renewable energy solutions and decentralized grids for ensuring energy equity.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	• All energy generation activities from wind are directly eligible. • Hybrid solar and wind power plants are included under this activity.
Amber (Transition)	N.A.
Red (Ineligible)	Power plants dedicated to supporting fossil fuel infrastructure (e.g., operations of fossil fuel activities) are ineligible.
DNSH Requirements	Promotion of circular economy • A waste management plan is in place to ensure end-of-life recycling of electrical and electronic equipment. • At the end of its useful life, equipment prepared for reuse, recovery, or recycling operations or appropriate treatment, including disposal of all fluids and selective treatment of waste electrical and electronic equipment.

Sector	Energy
Activity	**E3. Electricity generation from hydropower**
ISIC/PSIC	D3510
Description	This class includes: • Generation of bulk electric power, transmission from generating facilities to distribution centres and distribution to end users and power generation as part of cogeneration. • Operation of generation facilities that produce electricity, including thermal, nuclear, hydroelectric, gas turbine, diesel, and renewable • Operation of transmission systems that convey electricity from the generation facility to the distribution system • Operation of distribution systems (lines, poles, meters, wiring) that convey electricity received from the generation facility or the transmission system to the final consumer • Sale of electricity to the user • Activities of electric power brokers or agents that arrange the sale of electricity via power distribution systems operated by others • Operation of electricity and transmission capacity exchanges for electric power
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The activity meets any of the corresponding criteria. For run-of-the-river systems • The electricity generation facility is directly eligible if it is a run-of-the-river facility and does not have an artificial reservoir or reservoir (e.g., micro and mini-hydel projects that typically do not require a reservoir and operate on a run-of-river basis). • Run-of-the-river hydropower facilities must align with the parameters set by the relevant environmental authorities to be eligible.

Sector	Energy
Activity	**E3. Electricity generation from hydropower**
Green	For reservoir systems • If the power density of the electricity generation facility is greater than 5 W/m^2, the project is exempt from conducting the product carbon footprint lifecycle assessment or GHG protocol and they are directly eligible. Hydropower facilities with a power density of less than 5 W/m^2 must demonstrate, using ISO 14067, an environmental impact assessment hydro-framework, or a GHG protocol product such as the product carbon footprint, that they operate with lifecycle emissions of less than 100 gCO_2e/kWh. The electricity generation facility of the run-of-river plant is eligible if it does not have an artificial reservoir. • Pumped storage facilities are eligible if they meet the above requirements. The installations must be charged with energy sources that have emissions of less than 100 gCO_2/kWh.
Amber (Transition)	N.A.
Red (Ineligible)	Power plants dedicated to supporting fossil fuel infrastructure (e.g., operations of fossil fuel activities) are ineligible.
DNSH Requirements	Protection of healthy ecosystems and biodiversity • Ensure that the project is not located in a protected area. • Conduct an Environmental & Social Impact Assessments (ESIA) for hydropower projects to determine all possible impacts on the state of water bodies within the river basin and on the protected habitats and species that depend directly on the water resource, considering migration corridors, free-flowing rivers, and ecosystems close to undisturbed areas. • Establish a river basin management plan. • Avoid potential harm to biodiversity associated with ecosystem fragmentation and habitat changes, hydrological and hydrogeological regimes, water characteristics, and interference with species migration pathways because of the establishment of the installation and operation of hydroelectric plants and ensure a risk mitigation plan. • Integrate guidelines from the best international practices, such as the World Commission on Dams. • For hydropower projects located in or near biodiversity-sensitive areas (defined as areas identified as United Nations Educational, Scientific, and Cultural Organization World Heritage sites, key biodiversity areas, or other protected areas), perform an appropriate assessment. The Convention on Biological Diversity's Voluntary Guidelines on Biodiversity— Inclusive Impact Assessment and International Finance Corporation Performance Standard 6 can serve as a guideline. • Ensure downstream and upstream fish migration (e.g., fish-friendly turbines, fish guidance structures, fully functional fish passages, measures to stop or Minimise operation and discharges during migration or spawning). • Ensure that project uses a strategic environmental assessment for river basin planning and hydropower policy development. Pollution prevention and control • Avoid dumping waste into bodies of water and generation of waste during the construction phase and establish a waste management plan.

Sector	Energy
Activity	**E4. Geothermal energy generation (including electricity, heating, cooling)**
ISIC/PSIC	D3510
Description	Same as above
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Emission intensity measured during the lifecycle of the power plant is less than 100 gCO_2e/kWh.
Amber (Transition)	N.A.
Red (Ineligible)	Power plants dedicated to supporting fossil fuel infrastructure (e.g., operations of fossil fuel activities) are ineligible.
DNSH Requirements	Pollution prevention and control Verify control and prevention of emissions of non-condensable geothermal gases with specific environmental threats, such as hydrogen sulphide, CO_2, and methane, which are released from flash steam and dry steam power plants. • Ensure that binary plants have closed systems and do not emit steam. • Prevent thermal anomalies associated with waste heat discharge, which should not exceed 3°K for groundwater environments or 1.5°K for surface water environments. • Emissions to the atmosphere: Operations of high-enthalpy geothermal energy systems must ensure that adequate abatement systems are implemented to meet international standards and guidelines. (e.g., IFC Environmental, Health, and Safety Guidelines for Geothermal Power Generation).

Sector	Energy
Activity	**E5. Bioenergy power generation (including electricity, heating, cooling)**
ISIC/PSIC	D3510
Description	Same as above
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The project must meet the following criteria. • All installations must demonstrate that they operate with lifecycle emissions below the current threshold (100 gCO_2e/kWh). • Production of raw materials should not compete with food production, contribute to deforestation, or harm ecosystems. For this type of project, it is important to ensure the sustainable origin of the raw material (biomass) used for energy production, which can be verified using one of the following options. — *If the biomass consists of waste (e.g., agricultural, food industry, or municipal waste), the bioenergy produced is directly eligible.* — *If not, it must be verified that the feedstock used for bioenergy production meets the criteria of the corresponding activities in the agricultural sector of the Taxonomy.* — *If the first two options are not applicable, the sustainable origin of the feedstock used for bioenergy production can be verified using one of the following sustainability certifications that are recognized in the market.*

Sector	Energy
Activity	**E5. Bioenergy power generation (including electricity, heating, cooling)**
Green	» Forest Stewardship Council » Voluntary biomass biofuel scheme » Bonsucro—International Sustainability and Carbon Certification » Roundtable on Sustainable Biomaterials » Rainforest Alliance Note: These certifications ensure the sustainable origin of the raw material used for energy production.
Amber (Transition)	N.A.
Red (Ineligible)	Power plants dedicated to supporting fossil fuel infrastructure (e.g., operations of fossil fuel activities) are ineligible.
DNSH Requirements	Promotion of circular economy If the raw material is industrial biowaste (including food industry biowaste) or municipal biowaste, ensure the following: • Solid biowaste used in the manufacturing process must originate from source-separated waste streams and be collected separately (non-hazardous) • Biowaste must comply with the waste regulatory framework and national, regional, and local waste management plans. • When municipal biowaste is used as feedstock, the project is complementary and does not compete with the existing municipal biowaste management infrastructure. • If the feedstock is biogas, it must meet the substantial contribution criteria and compliance requirements set out in the sectoral whitepaper for the waste and emissions capture sector. Protection of healthy ecosystems and biodiversity • The installation does not replace forest areas or displace existing or planned housing.

Sector	Energy
Activity	**E6. Electricity generation from ocean energy**
ISIC/PSIC	D3510
Description	Same as above
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	All electricity generation activities from ocean energy are directly eligible.
Amber (Transition)	N.A.
Red (Ineligible)	Power plants dedicated to supporting fossil fuel infrastructure (e.g., operations of fossil fuel activities) are ineligible.
DNSH Requirements	Protection of healthy ecosystems and biodiversity • Avoid potential harm to marine ecosystems and biodiversity. • Demonstrate that the project or activity will not harm the ecosystem or landscape where it will be developed by establishing the appropriate preventive measures and paying attention to the risks derived from it. • Ensure that the project is not located in a protected area.

Sector	Energy
Activity	**E7. Electricity generation from hydrogen or its derivatives (e.g., ammonia)**
ISIC/PSIC	D3510
Description	Same as above
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The activity complies with the following criteria. • Emission intensity measured during the lifecycle of the power plant is less than 100 gCO_2e/kWh • Generation of electricity prioritizes the use of renewable energy sources such as solar photovoltaic and wind, with hydrogen used only if those are unviable. (This is because the generation of electricity from hydrogen is inefficient because it uses renewable energy to produce hydrogen, which is reconverted to electricity. The reconversion process could be avoided by using renewable energy directly.)
Amber (Transition)	Eligible capital expenditure measures that can meet any of these criteria. • Retrofit of existing power generation facilities (e.g., combined cycle gas turbine, fuel cells) to allow hydrogen or its derivatives to meet the combined cycle gas turbine technological readiness thresholds • New power plants (e.g., combined cycle gas turbine, fuel cells) that can allow 50 vol% hydrogen or more • Other capital expenditure investments that directly support or facilitate hydrogen uptake are eligible if the measures enable hydrogen or its derivatives to meet the combined cycle gas turbine technological readiness thresholds.
Red (Ineligible)	Power plants dedicated to support fossil fuel infrastructure (e.g., operations of fossil fuel activities) or electricity generation from hydrogen produced using fossil fuels are ineligible.
DNSH Requirements	Pollution prevention and control • Ensure that emissions to air, water, and soil are prevented or minimised per international standards and guidelines (e.g., IFC environmental, health, and safety guidelines: Air Emissions and Ambient Air Quality; ISO 14001:2015 Environmental Management Systems—Requirements with Guidance for Use; Strategic Approach to International Chemicals Management; ISO 11014:2009(en) Safety Data Sheet for Chemical Products).

Sector	Energy
Activity	**E8. Transmission and distribution of electricity**
ISIC/PSIC	D3510
Description	Same as above
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The activity is eligible if it meets one of the following criteria: • Transmission and distribution infrastructure or equipment that is in an electrical system that meets at least one of the following criteria. **Option 1:** All electricity transmission and distribution infrastructure and equipment in systems that are on a full decarbonization trajectory are eligible except for infrastructure that is dedicated to creating a direct connection or expanding an existing direct connection between an energy generation plant whose emissions exceed 100 gCO_2e/kWh, measured to a substation or grid.

Sector	Energy
Activity	**E8. Transmission and distribution of electricity**
Green	A system is considered to be on a full decarbonisation path if any of the following conditions are met. — *More than 67 percent of the connected generation capacity (new systems) from 2021, providing energy into the grid, is below the generation threshold of 100 gCO_2e/kWh (renewable energy), according to the product carbon footprint, over a 5-year average period.* — *The average emissions factor of the system grid is below the threshold value for the average for the last 5 years.* **Option 2:** Transmission and distribution infrastructure that supports expansion and consolidation of microgrids in non-interconnected areas is eligible. (Micro and mini grids are part of the scope.) In addition, the following activities related to grid modernization and efficiency improvements in the transmission and distribution network are directly eligible, regardless of whether the system is on a path to full decarbonization (exhaustive list of potential eligible investments). — *Projects associated with measures to strengthen the electricity grid and improve the quality by reducing losses* — *Construction and operation of the direct connection, or expansion of the existing direct connection, of low-carbon electricity generation below the 100 gCO_2e/kWh threshold measured on a life cycle basis to a substation or grid* — *Construction and operation of electric vehicle charging stations and support of electrical infrastructure for electrification of transport (subject to the Taxonomy eligibility in the transport sector)* — *Construction, installation, and operation of equipment and infrastructure where the primary objective is an increase in generation or use of renewable electricity* — *Installation of equipment to increase control and monitoring of the electrical system and enable development and integration of renewable energy sources, including:* » Sensors and measurement tools (including weather sensors to forecast renewable production) » Communication and control (including advanced software and control rooms, substation or feeder automation, and voltage control capabilities to accommodate more decentralised renewable feeds) — *Installation of equipment such as devices and smart metering systems that allow information to be brought to users so that they can act remotely on consumption, including customer data centres.* • Construction and installation of equipment that allows exchange of electricity, specifically renewable, between users. Interconnects between transmission systems are eligible, as long as one of the systems is eligible.
Amber (Transition)	• Projects that support the Indicative Generation Capacity Expansion Plan 2024-2034 to reduce carbon emissions from power generation to 209 g-CO_2/kWh by fiscal 2034 • Projects aligned with the National Electricity Policy and National Electricity Plan has set a target of 60 percent of renewable energy by 2030
Red (Ineligible)	• Transmission and distribution infrastructure dedicated to connecting fossil fuel plants to the grid is ineligible. • Infrastructure dedicated to creating a direct connection or expanding an existing direct connection between a substation or grid and an energy production plant that in its life cycle generates GHG of more than 100 gCO_2e/kWh is ineligible.

Sector	Energy
Activity	**E8. Transmission and distribution of electricity**
DNSH Requirements	Protection of healthy ecosystems and biodiversity • Avoid potential harm of underground power lines to marine and terrestrial ecosystems (proven by an environmental impact study). Avoid routes with significant associated environmental harms. Projects involving transmission of electrical energy through transmission lines exceeding 11 kilovolts, and large-scale power transmission projects must have an Initial Environmental Examination or a more detailed Environmental Impact Assessment before commencement (PEPA). • Conduct field trips in the project area where data are collected to detail aspects concerning flora, fauna, and fragile ecosystems of the site and ensure a risk mitigation plan. Pollution prevention and control • Comply with applicable rules and regulations to limit the impact of electromagnetic radiation on human health, particularly those established by the International Commission on Non-Ionizing Radiation Protection, in the case of high-voltage overhead lines. • Avoid using equipment, such as transformers or generators, that contain electrical fluid based on polychlorinated biphenyls. • Eliminate or reduce the use of SF6 (sulphur hexafluoride) gas in high-voltage switchgear and transition to "SF6-free" alternatives, such as Air Insulated Switchgear, Hybrid Switchgear by integrating air-insulated and gas-insulated components into one system, changing the insulation medium.

Sector	Energy
Activity	**E9. Transmission and distribution of renewable and low-carbon gases**
ISIC/PSIC	D3520
Description	Conversion, reuse, or repurposing of existing gas networks for use in transport and distribution of renewable and low-carbon gases (e.g., low-carbon hydrogen)
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The activity is eligible if it meets one of the following criteria. • Construction or operation of new transmission and distribution networks dedicated to hydrogen or other low-carbon gases that have lifecycle emissions of less than 100 gCO_2e/kWh • Conversion or reuse of existing natural gas networks to transport 100 percent low-carbon hydrogen • Conditioning of gas transmission and distribution networks that allow hydrogen and other low-carbon gases to be integrated into the network, including any gas transmission or distribution network activity that allows the mixture of hydrogen or other low-carbon gases (e.g., biomethane) to be increased in the gas system
Amber (Transition)	The activity complies with one of the following criteria. • Transmission and distribution networks transporting at least 50 vol% of low-carbon gases • Retrofit of natural gas distribution lines to allow at least 50 vol% of low-carbon gases
Red (Ineligible)	Transmission and distribution of fossil fuels, including natural gas, is excluded.

Sector	Energy
Activity	**E9. Transmission and distribution of renewable and low-carbon gases**
DNSH Requirements	Pollution prevention and control • Fans, compressors, pumps, and other equipment used comply with applicable regulations and represent the best available technology to Minimise risk of contamination by leaks. • Identify and manage risks related to water quality and/or water consumption at the appropriate level.

Sector	Energy
Activity	**E10. Energy storage**
ISIC/PSIC	D3510
Description	Construction and operation of facilities that store energy from the Taxonomy-aligned activities and return it in the form of electricity, heat, cooling, or steam. The activity includes pumped hydro storage, thermal energy storage (fluids, aquifer thermal energy storage, underground thermal energy storage), and compressed air storage. This activity can support integration of renewable energy systems into electricity transmission and distribution.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	All energy storage activities from the Taxonomy-eligible activities are directly eligible.
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	Promotion of circular economy • Waste electrical and electronic equipment, including batteries, must be disposed of for recycling with certified or authorised organisations. • If the storage capacity is more than 5 tonnes, the activity complies with international standards such as: ISO 19884 (Gaseous Hydrogen – Cylinders and tubes for stationary storage); IEC 63341-2 (Railway applications – Rolling stock – Fuel cell systems for propulsion -Part 2: Hydrogen storage system); ISO16111 (Transportable Gas Storage Devices - Hydrogen Absorbed in Reversible Metal Hydrides).

Sector	Energy
Activity	**E11. Low-carbon hydrogen production**
ISIC/PSIC	N.A.
Description	Hydrogen production can contribute to climate mitigation. The thresholds reflect the performance of electrolysis with low-carbon energy, as defined in electricity generation activities. The proposed thresholds are also in line with the current market best practices for certifying low-carbon hydrogen. Low-carbon hydrogen can decarbonise activities, reducing emissions in various sectors such as energy, transport, and manufacturing.
Environmental Objective	Climate change mitigation
Methodology	Criteria

Sector	Energy
Activity	**E11. Low-carbon hydrogen production**
Green	Hydrogen production must have lifecycle GHG emissions of 3 tCO_2e/t of hydrogen or less.
Amber (Transition)	N.A.
Red (Ineligible)	Hydrogen produced from fossil fuels including natural gas is not eligible.
DNSH Requirements	Promotion of circular economy • Waste and sub-products from the manufacturing process should be treated according to the waste hierarchy and ideally recycled in the same process.

Sector	Energy
Activity	**E12. Production of heating and cooling using waste heat**
ISIC/PSIC	D3530
Description	Waste heat contained in the products and by-products of a process, which raises their temperature to levels higher than those suitable for emission or storage. Energy-intensive industries consume significant volumes of energy for their mechanical, physical, and chemical processes. A large amount of this energy consumed (20–50 percent) is not used and is emitted into the environment in the form of waste heat. The waste heat contained in the products and by-products of a process can be used to increase efficiency and thus help reduce the carbon footprint of other activities.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	All activities related to production of heat or cooling from waste heat are eligible.
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	Pollution prevention and control: • Pumps and equipment used should comply, where relevant, with the top-class requirements of the energy label, and representing the best available technology.

Sector	Energy
Activity	**E13. District heating and cooling systems**
ISIC/PSIC	D3530
Description	Construction, refurbishment, and operation of pipelines and associated infrastructure for distribution of heating and cooling, ending at the sub-station or heat exchanger
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The activity must meet all the following criteria. • Construction and operation of pipelines and infrastructure associated with heat and cold distribution are eligible. The activities must comply with current regulations regarding energy efficiency. • All energy sources for heating and cooling must come from the Taxonomy-eligible activities.

Sector	Energy
Activity	**E13. District heating and cooling systems**
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	N.A.

Sector	Energy
Activity	**E14. Research and development and professional services**
ISIC/PSIC	N.A.
Description	This category includes research, development and implementation of innovative solutions, processes, technologies, technical advice, and business models designed to reduce, eliminate, or prevent GHG emissions. These solutions must demonstrate the ability to contribute substantially to the mitigation objective of the activities of the energy sector.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	• Creation of intangible assets and research, development and innovation activities that have the objective of promoting compliance with the substantial contribution criteria of the Taxonomy in the energy sector, including energy services companies, that comply with the thresholds of the Taxonomy is considered directly eligible. • Alternative fuels such as hydrogen and advanced biofuels, which are critical for decarbonising hard-to-abate sectors.
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	N.A.

Construction

Globally, the buildings and the construction sector were responsible for nearly 40 percent of total GHG emissions, including embodied emissions from new construction, in 2022 [60]. To increase energy efficiency in buildings, Pakistan enacted the Green Building Code, which sets minimum standards for energy efficiency during building operation (energy consumption for, e.g., heating, cooling, lighting, water heating). The construction sector also has an indirect impact on GHG emissions associated with the use of construction materials and techniques.

The energy subsector of the manufacturing and construction industries affects GHG emissions derived from combustion of fossil fuels, specifically in cement, iron, steel, chemicals, brick kilns, and other construction-specific industries. Its contribution to total national emissions is 13.86 percent, making it the third-most-significant subsector [54].

Emissions from the construction industry are predominantly linked to use of coal in brick kilns and the cement industry. In 2018, production of 82.5 billion fired bricks, fuelled by sources such as lignite, rice husks, rubber tires, plastics, and other agricultural residues, resulted in significant emissions. An estimated 13 million tons of coal was consumed for this purpose, with coal meeting 70 percent of the energy needs and 30 biomass meeting percent by biomass [61].

The Pakistan Engineering Council has developed and published following codes that should be considered for a green building project:

- Green Building Code of Pakistan (2023)
- Rainwater Harvesting Provisions for Building Code of Pakistan (2023)

Other codes have been created to improve construction of buildings in the country, reinforcing their safety, such as Building Code of Pakistan (2021), Building Code of Pakistan, Fire Safety Provisions (2016), Pakistan Electric and Telecommunication Safety Code (2014), Building Code of Pakistan - Energy Provisions (2011) and Building Code of Pakistan, Seismic Provisions (2007). Annex 4 lists the references used to determine the criteria for substantial contributions in the energy sector.

The activities within this sector are listed below.

Activity	ISIC/PSIC Code
B1. Construction of new buildings	F4100
B2. Renovation of existing buildings	F4100, F4330
B3. Individual measures and professional services	F4321, F4322, F4329
B4. Acquisition or ownership of buildings	L6810

A market baseline for energy consumption in Pakistan's buildings is provided in Annex 5. Technical screening criteria for the activities are listed below.

Sector	**Construction**
Activity	**B1. Construction of new buildings**
ISIC/PSIC	F4100
Description	Design and construction of new buildings presents an opportunity to increase energy savings and, in turn, mitigate GHG emissions during operation. This activity can contribute substantially more to climate change mitigation than conventionally designed buildings. The substantial contribution criteria of the activity seek to guarantee better performance than under National Sustainable Construction Standards: Energy Conservation Building Code 2023.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	**Option 1:** Residential construction For private homes, multi-family residential buildings, and social housing are included in this category. These buildings must meet any of the following criteria: • Energy demand (kWh/m^2 per year) must achieve 20 percent savings over the current American National Standards Institute (ANSI)/American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)/Illuminating Engineering Society of North America (IESNA) 90.1 standard or Energy Conservation Building Code of Pakistan, 2023. • In social housing, energy demand (kWh/m^2 per year) must achieve a minimum of 20 percent savings over the current ANSI/ASHRAE/IESNA 90.1 standard or Energy Conservation Building Code of Pakistan, 2023.

Sector	Construction
Activity	**B1. Construction of new buildings**
Green	For single-family dwellings (low-rise residential buildings) • Minimum energy efficiency requirements should be compared with the current version of ANSI/ASHRAE/IESNA 90.2. • Housing developments under the Prime Minister Five Million Naya Pakistan Housing Programme must comply with green building guidelines defined by the Ministry of Climate Change for this programme. For commercial, hotel, educational, hospital, and office construction • Energy savings must be at least 20 percent over the current ANSI/ASHRAE/IESNA 90.1 standard or the Energy Conservation Building Code of Pakistan, 2023. For each type of building that falls into this category. These criteria are applicable for the following building uses. • Offices of any size • Hotels with a minimum of 50 rooms • Shopping centres larger than 50,000 m^2 in area • Hospitals and health care centres larger than 1,500 m^2 in area • Schools and educational centres larger than 8,200 m^2 in area • Public buildings of any size • Restaurants in shopping centres **Option 2:** Operational emissions from buildings must be less than 23 kg of CO_2e/m^2 per year until December 31, 2030. This threshold must be reviewed periodically to ensure that it complies with decarbonisation trajectories for the construction sector (e.g., Carbon Risk Real Estate Monitor model) and in accordance with the objectives established in Pakistani regulations. **Option 3:** Equivalency with green building certification systems: The project, whether residential or commercial, is eligible if the design and construction have a green building certification that enables energy savings of at least 20 percent over the current baseline of ANSI/ASHRAE/IESNA 90.1 standard or the Energy Conservation Building Code of Pakistan, 2023[21] Applicable certifications • Leadership in Energy and Environmental Design • Excellence in Design for Greater Efficiencies • HQE International Other certifications will be considered for future updates of this Taxonomy provided that the percentage of savings in energy consumption or GHG emissions in relation to the thresholds of the Taxonomy can be verified and that they have independent third-party verification (outside the project) with national or international recognition. Note 1: The Green Building Code of Pakistan – 2023 can play a crucial role in supporting the country's Green Taxonomy by providing a structured framework for assessing green investments in the construction and real estate sectors by transforming green technologies. Note 2: Power generation plants as backup sources in case of power grid failure and micro-generation systems can be part of building services. These backup generation plants can use fossil fuels.
Amber (Transition)	N.A. (New buildings must meet green criteria.)

21 The National Energy Efficiency and Conservation Authority is collaborating with IFC and the World Bank on launching a local certification and rating system for a customized building rating system in Pakistan.

Sector	Construction
Activity	**B1. Construction of new buildings**
Red (Ineligible)	• Buildings must not be used for extraction, storage, transport or manufacturing of fossil fuels. • Energy for the operation of the building must not come directly from fossil fuels (e.g., power generation plants). • Restrict construction in Glacial Lake Outburst Floods (GLOF) -prone areas (buffer zones).
DNSH Requirements	Climate change adaptation and resilience • New buildings must incorporate strategies to enhance resilience to extreme weather events (e.g., floods, fires, earthquakes, hurricanes) and adapt to rising temperatures for internal comfort, following Pakistan's regulations and approved construction codes. • A climate and non-climate risk assessment scheme for the adaptation and resilience potential of the new building must be carried out. Examples of tools and methodologies are: — *Building Resilience Index (IFC-World Bank), used to assess the resilience of buildings to risk of damage from climatic events* — *Public Infrastructure Engineering Vulnerability Committee, developed by the Climate Risk Institute* — *Envision, developed by the Institute for Sustainable Infrastructure* — *Fast Infra Label, produced by Fast Infra Group* — *Other evaluation programmes or tools that enable the level of risk of damage from climatic and non-climatic events to be determined* Sustainable use and protection of water resources • All relevant water appliances (e.g., showers, faucets, toilets, urinals) must achieve at least 20 percent water savings compared to a baseline. If not, the building must adopt alternative water-saving measures (e.g., rainwater use, gray or black water reuse) to meet national standards. Promotion of circular economy • Demonstrate reuse and recycling of at least 20 percent of waste generated on site through a circularity plan (rising to 50 percent by 2028). • Demonstrate that the purchase of recycled materials for construction was prioritised with a sustainable purchasing plan (purchase considers sustainability Key Performance Indicators). In 2026, the goal of recycled or sustainable materials (that meet the criteria defined in the manufacturing sector) used in construction must reach at least 20 percent of total building materials. Pollution prevention and control • Guarantee that components and construction materials used do not contain asbestos or contaminating substances identified in the Registration, Evaluation, Authorisation and Restriction of Chemicals regulation or its equivalent in national technical standards. • If new construction is located on a potentially contaminated site, the site must be examined for potential contaminants and a management plan must be established. • For noise pollution, applicable standards must be met for eight-hour workdays and with a permissible exposure level of 85 dB(A) for eight hours, 100 dB(A) for four hours, 102 dB(A) for 45 minutes, and 115 dB(A) for seven minutes. • Ensure compliance with ASHRAE 62.1 & 62.2: Ventilation Standards for Indoor Air Quality (IAQ) Protection of healthy ecosystems and biodiversity • At least 15 percent of all wood products used in new construction for framing, cladding, and finishes must have been recycled, reused, or sourced from sustainably managed forests as certified by an accredited third-party certification body (e.g., Forest Stewardship Council, Programme for the Endorsement of Forest Certification).

Sector	Construction
Activity	**B2. Renovation of existing buildings**
ISIC/PSIC	F4100, F4330
Description	Renovation of buildings is a sustainable solution within the construction sector because, by its very nature, an existing building is reused, which will have a lower environmental impact than demolition. In addition to increasing efficiency, renovation can include energy generation systems (solar systems or similar), installation of charging points for electric vehicles, and integration of energy storage systems. Existing buildings must be adapted to adhere to new regulations and thus align with the country's commitments and goals to address climate change.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Renovation of residential buildings Private homes, multi-family residential buildings, and social housing are included in this category. These buildings must meet one of the following criteria. • Once the renovation has been completed, the percentage of energy savings must meet the criteria established for activity B1. • As an additional compliance alternative, it will be possible to verify that the installation of renewable energy generation systems allows a percentage of savings in final energy demand equivalent to 10 percent in addition to savings over the current baseline of ANSI/ASHRAE/IESNA 90.1 standard or the Energy Conservation Building Code of Pakistan, 2023. Renovation of commercial buildings These buildings must meet one of the following criteria. • The percentage of energy savings must meet the criteria established for activity B1. • As an additional compliance alternative, it will be possible to verify that installation of renewable energy generation systems (non-conventional sources) allows a percentage of savings in equivalent final energy demand, in kWh/m^2 year, of at least 10 percent in addition to the savings over the current baseline of ANSI/ASHRAE/IESNA 90.1 standard or the Energy Conservation Building Code of Pakistan, 2023. **Equivalency with green building certification systems** Renovation of a residential or commercial building is eligible if the design and construction have a green building certification that enables verification of energy savings of at least 20 percent over the current baseline of ANSI/ASHRAE/IESNA 90.1 standard or the Energy Conservation Building Code of Pakistan, 2023. Applicable certifications • Leadership in Energy and Environmental Design • Excellence in Design for Greater Efficiencies • HQE International • Living Building Challenge Other certifications will be considered for future updates of this taxonomy provided that the percentage of savings in energy consumption or GHG emissions in relation to the thresholds of the Taxonomy can be verified and that they have independent third-party verification (outside the project) with national or international recognition. For single-family dwellings (low-rise residential buildings), minimum energy efficiency requirements should be compared with the current version of ANSI/ASHRAE/IESNA 90.2.

Sector	Construction
Activity	**B2. Renovation of existing buildings**
Green	Note 1: The Green Building Code of Pakistan – 2023 can play a crucial role in supporting the country's Green Taxonomy by providing a structured framework for assessing green investments in the construction and real estate sectors by transforming green technologies. Note 2: Power generation plants as backup sources in case of power grid failure and micro-generation systems can be part of building services. These backup generation plants can use fossil fuels.
Amber (Transition)	N.A.
Red (Ineligible)	• Buildings must not be used for extraction, storage, transport, or manufacturing of fossil fuels. • Energy for operation of the building must not come directly from fossil fuels (e.g., power generation plants). • Power generation plants as backup sources in case of power grid failure and micro-generation systems that allow the use of solid waste can be part of the building services.
DNSH Requirements	Sustainable use and protection of water resources • All relevant water appliances (e.g., showers, faucets, toilets, urinals) must achieve at least 20 percent water savings. If not, the building must adopt alternative water-saving measures (e.g., rainwater use, grey or black water reuse) to meet national standards. Promotion of circular economy • Demonstrate reuse and recycling of at least 20 percent of waste generated during construction through a waste management plan. • Demonstrate use of recycled materials or recycled raw materials for 20 percent of the total project materials. Pollution prevention and control • Before renovation, a specialist trained in asbestos removal and identification of other materials containing substances of concern must inspect the building in accordance with national legislation. • Trained personnel must remove any coating that contains or may contain asbestos (e.g., removal or modification of insulation panels, tiles, or other materials containing asbestos), with health surveillance before, during, and after the work and in accordance with applicable regulations.

Sector	Construction
Activity	**B3. Individual measures and professional services**
ISIC/PSIC	F4321, F4322, F4329
Description	Inclusion of individual measures and professional services is a fundamental, cross-sector activity in construction and renovation of buildings by allowing the minimum percentages of energy savings indicated in this Taxonomy to be achieved. The proposed measures are designed to take advantage of environmental conditions, maximising sources of thermal control (control of temperature), natural ventilation, and energy reduction and promoting use of mechanical and electrical systems such as boilers, air conditioning, mechanical ventilation, and electric lighting to create comfortable conditions for occupants. These measures can be implemented at the building level and at the municipal level so that their transversality facilitates their adoption. These are related to: B1. Construction of new buildings and B2. Renovation of existing buildings

Sector	Construction
Activity	**B3. Individual measures and professional services**
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	**Building level** Individual measures and professional services are important, especially for building renovation, reducing energy use and emissions during the operational phase of a building. Individual measures can be classified into two categories. • Efficiency (improvements in, e.g., lighting, air conditioning and pumping systems, thermal insulation, hydraulic devices, elevators, home automation) • On-site energy generation and storage and charging points for electric vehicles Individual measures and professional services have been included as enabling activities that help improve energy performance and increase decarbonization of buildings. The list must be updated periodically. Some individual measures are listed as always eligible; that is, there are no technical requirements to meet, because these technologies are dedicated to facilitating energy savings and efficient use of electricity. Professional services are necessary for proper evaluation of construction conditions and the potential for energy efficiency. Eligible individual measures, conditioned to demonstration of impact through a technical study: • Adding insulation to existing envelope components such as external walls, roofs (including green roofs), lofts, basements, and ground floors (including measures to ensure watertightness and to reduce the effects of thermal bridges and scaffolding) and products for applying insulation to the building envelope (e.g., mechanical fixings, adhesives). The energy reduction through these strategies must be demonstrated in a technical report. It must be demonstrated how and how much these strategies reduce energy consumption of the building. • Replacing existing windows with new energy-efficient windows. It is necessary to demonstrate how and how much the building's energy consumption decreases. • Replacing external doors with new energy-efficient ones, with a demonstration of the reduction of the energy consumption of the building. • Applying reflective paint on roofs to reduce thermal loads, thereby reducing the energy consumption of the building and increasing the thermal comfort of the space • Replacing water heating systems with highly efficient systems or solar water heating systems • Replacing existing pumps with energy-efficient pumps • Installing efficient LED lighting and lighting control systems • Installing low-flow kitchen faucets and sanitary taps that allow water saving parameters to be equalled or exceeded • Assembling and operating electric heat pumps that use refrigerants with a global warming potential of 675 or less and meet energy-efficiency requirements stipulated in relevant regulations • Installing green roofs and walls that provide substantial thermal insulation in buildings Individual measures that are always eligible: • Zone thermostats, smart thermostat systems, and sensor equipment (e.g., motion and daylight control systems) (see ICT sector) • Building management systems (see ICT sector) • Electric vehicle charging points • Smart energy and gas meters • Facade and roof elements with solar protection or control functions, including those that support growth of vegetation • Infrastructure for separation of waste at the source in line with current regulations

Sector	Construction
Activity	**B3. Individual measures and professional services**
Green	Other individual measures that are always eligible when implemented as part of building services • Solar photovoltaic systems (and auxiliary technical equipment) for self-consumption and grid tied • Solar collectors for heating water (and auxiliary technical equipment) • Other energy generation systems from renewable sources (e.g., wind energy, waste). • Installation of new heat pumps that contribute to renewable energy goals in heating and cooling (and the necessary auxiliary technical equipment) or replacement of existing ones • Wind turbines (and auxiliary technical equipment) • Thermal or electrical energy storage units (and auxiliary technical equipment) • High-efficiency micro–combined heat and power plant • Heat exchangers and recovery systems • Rainwater harvesting systems, grey or wastewater treatment systems for reuse that help reduce demand for fresh water. The following professional services are always eligible. • Technical consultancies (e.g., energy simulation, project management, issuance of energy performance certificates, energy consultants, specialised training) linked to the individual measures mentioned above • Accredited energy audits and building performance evaluations • Energy management services and contracts, including services that energy services companies provide • Sustainable building designers and accredited professionals in certification systems **Municipal level** Initiatives and projects at the municipal or district level substantially mitigate GHG emissions. Implementation of clean (low carbon) technologies or urban development strategies increases the efficiency of city management. Low-carbon urban growth helps increase density in cities with a lower environmental impact and reduce use of natural resources required to obtain services offered by these natural areas. Energy • Self-sufficient public lighting systems that avoid construction of energy transmission networks • Public lighting management systems based on the presence of people and predetermined schedules in such a way that energy is not used when lighting in the sector is not required • On-site energy generation systems (distributed energy resources) • Electric vehicle charging points in urban areas Mobility • Interventions at the municipal level that favour reduction of emissions due to mobility (e.g., route adjustment, modal changes) Waste • Waste to energy projects on a neighbourhood or building scale • Waste transfer centres that promote recycling and reuse, avoiding transport and disposal of waste to landfills or final waste disposal centres

Sector	Construction
Activity	**B3. Individual measures and professional services**
Green	Water • Sustainable urban drainage systems that demonstrate retention of runoff water in cities • Wastewater treatment plants (grey and black) to avoid disposal of wastewater into municipal treatment systems • Commercial and residential micro-generation systems from wastewater or waste treatment ICT • Sensor networks and integrated systems to increase the efficiency of urban development, optimise the functioning of infrastructure, integrate various services (e.g., smart city context: energy + mobility + construction), and facilitate the creation of intelligent advanced measurement systems Landscape • Trees in road easements that provide shade and are easy to maintain • Recovery of public spaces from urban rivers after the rivers have been cleaned.
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	N.A.

Sector	Construction
Activity	**B4. Acquisition or ownership of buildings**
ISIC/PSIC	L6810
Description	Promoting energy efficiency and reducing GHG emissions in existing buildings through acquisition and ownership helps avoid the impacts of building new buildings, increasing demand of green buildings, generating incentives for owners to renovate buildings with energy efficiency standards and positioning acquisition of buildings as an emerging value market.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Acquisition or ownership of buildings may be eligible in these cases. • Buildings built after December 31, 2020, must meet the criteria specified in the new building construction activity (B1). • Buildings built between December 31, 2015, and December 31, 2020, must have a percentage of savings in energy demand that is at least 15 percent greater than the current baseline of ANSI/ASHRAE/IESNA 90.1 standard. • Buildings built before December 31, 2015, must demonstrate savings in energy demand of at least 10 percent greater than the current baseline of ANSI/ASHRAE/IESNA 90.1 standard. Note 1: The Green Building Code of Pakistan – 2023 can play a crucial role in supporting the country's Green Taxonomy by providing a structured framework for assessing green investments in the construction and real estate sectors by transforming green technologies. Note 2: Power generation plants as backup sources in case of power grid failure and micro-generation systems can be part of building services. These backup generation plants can use fossil fuels.

Sector	Construction
Activity	**B4. Acquisition or ownership of buildings**
Amber (Transition)	N.A.
Red (Ineligible)	Buildings must not be used for extraction, storage, transport, or manufacturing of fossil fuels.
DNSH Requirements	N.A.

Waste and Water

Waste

The waste sector has a large environmental impact because of emissions from landfills and waste incineration and directly affect soil and water pollution. Effective waste management has the potential to help other sectors reducing GHG emissions through waste prevention, separate hazardous waste collection, and waste reuse and recycling. Waste-to-energy technologies offer the possibility of generating electricity and fuels that can replace fossil fuels in public transport. In Pakistan, the waste sector emitted 32.44 tCO_2e, accounting for approximately 6 percent of total emissions [54], of which approximately 80 percent was methane, 11 percent nitrogen oxides, and 0.3 percent CO_2. Annex 4. lists the references used to determine the criteria for substantial contributions in the waste and water sector.

The activities within this sector are listed below.

Activity	ISIC/PSIC Code
W1. Collection and transport of non-hazardous waste	E3811
W2. Biowaste treatment: composting of biowaste	E3821
W3. Biowaste treatment: anaerobic digestion	E3821
W4. Landfill gas capture and use	E3821, E3822
W5. Material recovery facilities	E3830
W6. Research and development—professional services	N.A.

The technical screening criteria for the activities are listed below.

Sector	Waste
Activity	**W1. Collection and transport of non-hazardous waste**
ISIC/PSIC	E3811
Description	Selective collection and transport of non-hazardous waste precedes reuse and recycling of this waste. The activity includes segregation of waste at the source, in households and businesses, and its transport to recover reusable materials and perform the corresponding treatment. This can include use of containers, collection and transport vehicles, auxiliary technological equipment, and information technology systems, among other useful services for separating waste collection (e.g., informational material, campaigns, activities with waste advisors), and related infrastructure (e.g., civic service centres, temporary storage, transfer facilities).

Sector	Waste
Activity	**W1. Collection and transport of non-hazardous waste**
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	• All projects related to collection and transport of non-hazardous waste that is segregated at the source or at an intermediate sorting facility that is intended for preparation for reuse, recycling or recovery operations are directly eligible. • Facilities that optimise transport (e.g., transfer stations) and investments in compacting, shredding, and other activities that increase logistical capacity to collect, store, and unload waste are included, in compliance with guidelines that include an operation permit issued by the ruling body. Note: This activity applies to non-hazardous waste generated in the country, because the main objective is to reduce GHG emissions associated with final disposal of waste (climate change mitigation). Treatment of imported non-hazardous waste can increase the scope 3 footprint, but this activity can be evaluated under the circular economy objective in future phases of the Taxonomy.
Amber (Transition)	Direct collection and transport of non-hazardous waste for energy recovery without material recovery for recycling
Red (Ineligible)	Direct collection and transport of non-hazardous waste for disposal to landfills that does not include adequate equipment for collection and transport.
DNSH Requirements	Promotion of circular economy • Waste collected separately must not be mixed in storage and transfer facilities with other waste or materials with different properties. • Technology that allows for optimal use of solid waste so that it does not reach the final disposal site without treatment must be used. • Operators must have licenses issued by the appropriate authority to ensure that collection and transport operations of non-hazardous waste are in line with regulations. Pollution prevention and control • Leachates must be properly managed during transport of waste. • The waste collection vehicles must comply with permissible emission limits set in the National or provincial Environmental Quality Standards for Motor Vehicle Exhaust and Noise or other applicable regulations.

Sector	Waste
Activity	**W2. Biowaste treatment: composting of biowaste**
ISIC/PSIC	E3821
Description	Composting is the process by which microorganisms decompose biodegradable waste in the presence of oxygen, which is why it is sometimes referred to as aerobic digestion. The aerobic digestion of domestic organic waste includes domestic waste generated in households. This definition helps identify which waste can be considered for this initiative. Among the benefits of this activity are: • Stabilisation of organic matter and reduction of bad odours • Reduction of organic load • Minimisation of GHG emissions As part of an integrated waste management system, composting diverts biodegradable waste from landfills and thus reduces GHG emissions, especially methane, in the biological decomposition process.

Sector	Waste
Activity	**W2. Biowaste treatment: composting of biowaste**
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Composting of organic waste is eligible if it meets all the following criteria: • The system is sustainable, with organic waste segregated before being placed in the system. • The system is well aerated to avoid development of anaerobic zones in the compost piles that can generate methane. • The compost produced is used as fertiliser or for soil improvement.
Amber (Transition)	The activity complies with all of the following criteria: • Unsegregated waste is received at the site and sorted before the organic fraction is composted. • Ensure good operations avoid methane generation (e.g., proper aeration or mixing).
Red (Ineligible)	The activity is described by any of the following. • Waste is not segregated at the source or pre-sorted. • There is not a proper aeration system. • Compost quality is poor and is not suitable for application to soil.
DNSH Requirements	Promotion of circular economy • Ensure compliance with PEPA, 1997 for principles on management of hazardous and non-hazardous waste, including compliance with the National or provincial Environmental Quality Standards, established under PEPA, that play a vital role in waste management, particularly in controlling discharge of pollutants into the environment. • Use efficient equipment and technology that enable optimal use of organic solid waste to ensure that it does not reach the final disposal site. • Ensure that the resulting compost meets requirements for organic fertilisers established in the national standards for fertilisers and soil improvers for agricultural use, such as the National Bio-Safety Guidelines, the Organic Fertiliser Standards issued by the Pakistan Standards and Quality Control Authority, and various provincial fertiliser acts (e.g., Punjab Fertiliser Act, Sindh Fertiliser Ordinance). Pollution prevention and control • Minimise atmospheric emissions (e.g., ammonia, methane, formic acid, hydrogen sulphide, particles) by using filters in the system. • If effluents are disposed of within the sewer system because of the activity, discharge must comply with the technical regulation that applies. • For composting plants that treat more than 75 tonnes per day, establish an emissions and odour management plan and ensure that air and water emissions are within the ranges of current regulations.

Sector	Waste
Activity	**W3. Biowaste treatment: anaerobic digestion**
ISIC/PSIC	E3821
Description	In anaerobic digestion, microorganisms decompose organic matter in an environment without oxygen, transforming it into a less-polluting substance. As part of an integrated waste management system, anaerobic digestion is a important to divert biodegradable waste from landfills, reducing GHG emissions, particularly methane. Under controlled conditions, the anaerobic digestion process produces biogas rich in methane and a liquid residue rich in nutrients called digestate.

Sector	Waste
Activity	**W3. Biowaste treatment: anaerobic digestion**
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Anaerobic digestion of organic waste is directly eligible if it meets all the following criteria: • The organic waste is separated at the source. An integrated management plan must be established for the rejects. • A monitoring and control plan for various products such as methane, biogas, and digestate must be established to prevent leaks that pose a health or environmental risk. • The biogas must be used as an energy source for electricity or heat or upgraded to biomethane for injection into the natural gas grid or use as vehicle fuel or feedstock in the chemical industry. • The digestate generated in these types of systems must be adequately characterised to determine whether it meets maximum permissible limits specified in national technical regulations and must be used as compost, fertiliser, or raw material for composting. • Punjab environmental quality standards of PEPA and the Sindh Waste to Energy Act must be conformed with if applicable, or other National Environmental Quality Standards or Note 1: Activities that facilitate the use of biogas (e.g., upgradation, compression) are also eligible.
Amber (Transition)	Until 2030, the activity complies with all the following criteria. • Waste is pre-sorted at the facility but not source separated. • A monitoring and contingency plan is in place to minimise methane leakage at the facility. • The biogas produced is flared directly without using it as energy. Systems that include only biogas flaring are eligible if they are part of a transition programme to other types of use in the medium term (<3 years). The digestate produced must meet any of the following criteria. • Biowaste (excluding sewage sludge) from single-digestion facilities is used as fertiliser or soil improver, directly or after composting or any other treatment as permitted under the applicable regulations. • Biowaste from anaerobic digestion of sewage sludge will be further processed and not disposed of directly in landfills. Incineration is allowed because it allows energy recovery, and the waste is converted to ash after incineration and can be landfilled. • Biowaste from co-digestion facilities must be processed further to ensure resource recovery and cannot be disposed of directly.
Red (Ineligible)	The activity meets any of the following criteria: • Waste is not source segregated or pre-sorted. • No methane leakage detection system is installed. • Digestate is not used as fertiliser or soil improver or for energy recovery (in case of sewage sludge as a feedstock).
DNSH Requirements	Sustainable use and protection of water resources • For discharge of effluents into surface waters or other water sources, PEPA 1997 and amendments and the applicable National or Provincial Environmental Quality Standards must be complied with. Promotion of circular economy • Verify PEPA 1997 for principles on management of hazardous and non-hazardous waste, including compliance with National or Provincial Environmental Quality Standards, established under PEPA, that play a vital role in waste management, particularly in controlling discharge of pollutants into the environment. • Use efficient equipment and technology that allow optimal use of solid waste through anaerobic digestion to ensure that the waste does not reach the final disposal site.

Sector	Waste
Activity	**W3. Biowaste treatment: anaerobic digestion**
DNSH Requirements	Pollution prevention and control • Minimise significant release of gases into the environment (e.g., ammonia, hydrogen sulphide, CO_2, particles) by using filters in the system and implementing devices for monitoring gas leaks. Formation of hydrogen sulphide during anaerobic digestion constrains the valorisation of biogas and filters must be implemented for subbing such impurities in the biogas. • Control and reduce air emissions (e.g., nitrogen oxides, sulphur oxides, particles) after biogas combustion (when necessary) and ensure that they are within the limits set under the National Environmental Quality Standards established under PEPA. • When the resulting digestate is intended to be used as fertiliser or a soil amendment, ensure that it complies with the National Bio-Safety Guidelines, the Organic fertiliser Standards issued by the Pakistan Standards and Quality Control Authority, and applicable provincial fertiliser acts (e.g., Punjab fertiliser Act, Sindh fertiliser Ordinance)

Sector	Waste
Activity	**W4. Landfill gas capture and use**
ISIC/PSIC	E3821, E3822
Description	The activity is generally conducted as part of or as a complement to closure and remediation of closed landfills (anaerobic, semi-anaerobic and semi-aerobic e.g., those based on Fukoka method). Collection of landfill gas and its use for energy generation helps mitigate climate change by: Reducing methane emissions to the atmosphere from biodegradable waste previously deposited in landfills Displacing use of fossil fuels
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The activity complies with all of the following criteria. • The landfill or landfill cell where the gas capture system is installed, expanded, or modernised is permanently closed and no longer receives waste. • Landfill gas produced is used for electricity or heat generation as biogas, transformed into biomethane for injection into the natural gas grid, used as fuel for vehicles, or used as a raw material in the chemical industry. • Methane emissions from the landfill and leaks from landfill gas collection and use facilities are controlled and monitored.
Amber (Transition)	Until 2030, systems that include only biogas flaring (without use of the biogas) are eligible if they are part of a transition programme to other types of use in the medium term (<3 years).
Red (Ineligible)	The activity meets any of the following. • Operational landfill cells that are receiving unprocessed municipal solid waste • Landfills where biogas is not captured or flared without use for generation of heat or electricity or production of biomethane.
DNSH Requirements	Pollution prevention and control • Landfills where gas capture systems are installed are closed, rehabilitated, and cared for following national and international provisions (e.g., International Best Practices Guide for Landfill Gas Energy Projects from the Global Methane Initiative).

Sector	Waste
Activity	**W4. Landfill gas capture and use**
DNSH Requirements	• Atmospheric emissions (e.g., nitrogen oxides, sulphur oxides) after landfill gas combustion are controlled, reduced (when necessary), and kept within the limits established by the National or Provincial Environmental Quality Standards established under PEPA. • The landfill gas capture and closure process must apply the guidelines on solid waste management that PEPA or relevant environmental authorities to have established ensure there that there are no adverse effects on air quality, soi, or water bodies, if applicable.

Sector	Waste
Activity	**W5. Material recovery facilities**
ISIC/PSIC	E3830
Description	Infrastructure and equipment to facilitate material separation and recovery.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The activity complies with all the following criteria: • Construction and operation of facilities for sorting and processing separately collected non-hazardous waste streams into secondary raw materials involving mechanical reprocessing except for backfilling purposes is eligible. • At least 50 percent of the weight of the collected materials is converted into secondary raw materials. • The sorted waste may be used as secondary raw material and substituted for virgin materials in production processes. Note: All facilities and equipment such as conveyor belts, compactors, pelletizers, air classifiers, magnetic belts, and other infrastructure required for material recovery are eligible.
Amber (Transition)	The activity complies with all of the following criteria: • The activity has a recovery efficiency of at least 40 percent. The sorted waste stream may then be converted into secondary raw materials that can be substituted for virgin materials in production processes. • All facilities must meet the green criteria after 2030.
Red (Ineligible)	Recovery efficiency of the material recovery facility is less than 40 percent.
DNSH Requirements	N.A.

Sector	Waste
Activity	**W6. Research and development and professional services**
ISIC/PSIC	N.A.
Description	This category includes research, development and implementation of innovative solutions, processes, technologies, technical advice, and business models designed to reduce, eliminate, or prevent GHG emissions. The ability of these solutions to contribute significantly to the mitigation objective of the activities of the waste sector must be demonstrated.
Environmental Objective	Climate change mitigation

Sector	Waste
Activity	**W6. Research and development and professional services**
Methodology	Criteria
Green	Creation of intangible assets and research, development, and innovation activities designed to promote compliance with the substantial contribution criteria of the Taxonomy in the waste sector are considered directly eligible. Some intangible assets and research, development, and innovation activities that enable substantial contribution to climate change mitigation are: • Development of waste recovery and recycling technologies for organic and inorganic waste, including innovations in mechanical recycling, chemical recycling, anaerobic digestion, and black soldier fly technologies • Development of ICT for waste collection tracking and monitoring to promote source segregation • Development of technologies to treat non-recyclable fractions of waste, including refuse-derived fuel technologies. • Development and implementation of comprehensive operations and maintenance protocol services
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	N.A.

Water

Investments in the water sector affect climate resilience, agricultural sustainability, energy generation, manufacturing processes, food systems and other supply chains, and hence affects various sectors of the economy.

Pakistan has several national standards for design and construction of water and sanitation systems.

- Pakistan Engineering Council standards for water supply and wastewater systems
- National Sanitation Policy, 2006, which provides guidelines for wastewater collection, treatment, and disposal
- Pakistan Standard and Quality Control Authority, which sets standards for construction materials used in water and sewer systems
- World Health Organisation guidelines and Pakistani standards for drinking water quality, which address factors such as turbidity, chemical contamination, and microbial safety

To address regulations specific to water, use and management in Pakistan, it is essential to refer to the provincial water acts. Each province in Pakistan has its own water laws and regulations to manage water resources effectively.

- Punjab Water Act, 2019
- Sindh Water Management Ordinance, 2002
- Khyber Pakhtunkhwa Water Act, 2014

The activities within this sector are listed below.

Activity	ISIC/PSIC Code
W7. Construction, extension, and operation of new and existing water collection, distribution, and treatment systems	E3600
W8. Construction and renewal of sanitary sewer systems	E3700

Activity	ISIC/PSIC Code
W9. Wastewater treatment systems	E3700
W10. Investments for efficient water use	N.A.
W11. Research and development—professional services	N.A.

The technical screening criteria for the activities are listed below.

Sector	Water
Activity	**W7. Construction, extension, and operation of new and existing water collection, distribution, and treatment systems**
ISIC/PSIC	E3600
Description	Reducing energy consumption in a water supply system reduces GHG emissions. Some alternatives to achieving this include using more-efficient sources to replace those that demand more energy, implementing more-efficient pumping sources, and managing technical water loss. Some energy-efficiency measures can directly reduce energy consumption in a water supply system, allowing for significant reductions in GHG emissions, including: • Efficient sources to replace those that require more energy (e.g., using surface sources instead of groundwater sources through water harvesting) • Efficient pumping systems • Variable-frequency drives for pumps • Digitalisation and automation For distribution systems, water loss management measures include: • Active leakage control • Flow and pressure management • Rapid, effective repairs • Infrastructure and asset management (including maintenance) • Measurement and micro-measurement • Monitoring and reporting • Digitalisation and automation
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The activity must meet the corresponding criteria. New systems **Abstraction and water treatment plants:** Average net energy consumption for intake (abstraction) and treatment is 0.5 kWh/m3 of water produced or less, or the average carbon intensity of the energy for these systems is 100 gCO_2/kWh or less over the infrastructure's lifetime. Net energy consumption can consider measures that reduce energy consumption, such as source control (contaminant load inputs) and, where appropriate, energy generation (e.g., hydropower, solar, wind). **Desalination:** If a desalination plant is used, energy used for the systems must have emissions of 100 gCO_2e/kWh or less, or the energy consumption of the plants must be less than 3.5 kWh/m3 of potable water produced (e.g., Reverse Osmosis treatment and Electrodialysis Reversal). **Distribution and supply systems:** Structural leaks have a threshold of 1.5 in the management zone or network according to the Structural Leakage Index (also referred to as Infrastructure Leakage Index). To achieve this, compliance with the technical standards is required as a preventive measure.

Sector	Water
Activity	**W7. Construction, extension, and operation of new and existing water collection, distribution, and treatment systems**
Green	Existing systems **Abstraction and water treatment plants:** Reduce the average energy consumption of the system by at least 20 percent compared to the reference results averaged over three years in kWh/m3 of treated water supplied. **Distribution or supply systems:** Reduce losses (Infrastructure Leakage Index) by at least 20 percent in the network segment (management zone) compared with the reference results averaged over the previous three years. Infrastructure Leakage Index = current annual real losses/unavoidable annual real losses **Decentralised technologies for rural and urban areas** The following decentralised technologies are directly eligible • Manual hand pumps or motorized pumps using renewable energy • Solar-powered pumps for extraction from boreholes • Gravity-fed systems in which water is sourced from nearby rivers or springs using gravity to move the water • Rainwater harvesting systems for household and community-level collection • Water trucking in areas with no access to freshwater sources • Remote monitoring of rural water systems (e.g., sensing of water in the pump head, traditional flow sensor on pump outflow, sensing movement of pump parts) • Water automated teller machines (water kiosks) • Slow and rapid sand filters for water treatment Note: All these systems must demonstrate access to safe water. This list should be updated as new information is developed on decentralised technologies for drinking water supply.
Amber (Transition)	For abstraction and treatment systems • Net average energy consumption for abstraction and treatment is equal to or less than: — *1.5 kWh/m3 of produced water supply by 2028* — *0.7 kWh/m3 of produced water supply by 2030* — *0.5 kWh/m3 of produced water supply by 2035* • Net energy consumption may consider implementation of measures that decrease energy consumption, such as source control (pollutant load inputs) and, as appropriate, onsite or offsite energy generation (e.g., hydraulic, solar, wind). For distribution or supply systems • Structural leaks have a threshold of 2 in the management zone or network according to the Structural Leakage Index (Infrastructure Leakage Index). To achieve this, compliance with the technical standards is required as a preventive measure.
Red (Ineligible)	N.A.
DNSH Requirements	Promotion of circular economy • Integrate efficient waste management into the project for management of sludge and other waste produced. • Develop a water monitoring plan at the plant's inlet and outlet to maintain a record of water quality. Pollution prevention and control • Verify that abstraction and water treatment plants comply with World Health Organization guidelines and National or Provincial Environmental Quality Standards Parameters for Drinking Water covering factors such as turbidity, chemical contamination, and microbial safety. If Reverse Osmosis is deployed, management of reverse osmosis rejected water should be managed based on current regulations.

Sector	Water
Activity	**W7. Construction, extension, and operation of new and existing water collection, distribution, and treatment systems**
DNSH Requirements	• Ensure that projects are aligned with the National Water Conservation Strategy of the Pakistan Council of Research in Water Resources and the Water Policy, 2018. • Ensure that there is an adequate management plan for disposal and treatment of oils and lubricants in addition to complying with applicable regulations. • Implement a management plan for chemicals or processes to avoid damage to water sources, soil, and ecosystems. Sustainable use and protection of water resources • Catchment activities must be registered and studied and comply with the Water Accord, 1991; the Groundwater Management Ordinance, 2002; the principles of the Water Policy; and the Indus Water Treaty, ensuring the natural flow of the resource.

Sector	Water
Activity	**W8. Construction and renewal of sanitary sewer systems**
ISIC/PSIC	E3700
Description	Sanitary sewer systems are designed to collect wastewater for pretreatment and treatment systems. This activity should focus on increasing efficiency to reduce energy consumption and increase collection of wastewaters, thereby reducing emissions that untreated discharge into water bodies generate. These systems, which are connected to treatment systems, support coverage of wastewater treatment services and consequently mitigate GHG emissions.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The following systems and technologies are eligible. • Centralised and distributed effluent treatment systems that comply with standards for construction materials used in water and sewer systems set by the Pakistan Standard and Quality Control Authority • Those that prevent leaks or overflows of untreated wastewater • Collection and transport systems that increase the volume of treated wastewater or reduce the discharge of untreated wastewater • Systems that reduce water consumption through reuse, including projects to segregate municipal water, stormwater, and industrial drainage for specialized treatment • Separation of stormwater and wastewater systems with the objective of treating the wastewater Note: A monitoring plan that includes appropriate measures for climate change adaptation through an integrated watershed, forest, and biodiversity management plan must be established for each sanitary sewer system.
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	Promotion of circular economy • Establish an adequate management plan for disposal and treatment of sludge and waste. Pollution prevention and control • Establish an adequate management plan for disposal and treatment of oils and lubricants.

Sector	Water
Activity	**W9. Wastewater treatment systems**
ISIC/PSIC	E3700
Description	Wastewater treatment, or purification, consists of a series of physical, chemical, and biological processes designed to eliminate contaminants in water. This activity generates 3 to 7 percent of all GHG emissions, and it is estimated that 80 to 90 percent of these are released into the environment without being treated [62]. Methane capture from sludge resulting from wastewater treatment is covered in an activity of the waste sector.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The following substantial contribution criteria apply to these systems: • Centralised wastewater treatment systems (e.g., municipal and clustered population centres) • Alternative or individual, decentralized wastewater treatment systems with specific discharges (e.g., agricultural and industrial sources) New systems must meet one of these criteria: • The new wastewater treatment system replaces a high-GHG-emission treatment system (e.g., pit latrine, septic tank, anaerobic lagoon). For these criteria, it must be demonstrated that the new system achieves GHG savings of at least 20 percent over the current system. • The net energy consumption of the wastewater treatment plant is: — *35 kWh or less per population equivalent per year for a treatment plant capacity of less than 10,000 population equivalent per year* — *25 kWh or less per population equivalent per year for a treatment plant capacity between 10,000 and 100,000 population equivalent per year* — *20 kWh or less per population equivalent per year for a treatment capacity greater than 100,000 population equivalent per year* Existing systems must meet one of the following criteria. • Investments that increase the capacity of the treated flow (when the system meets the criteria established for new systems) or the effectiveness in the process of contaminant load removal • Investments that reduce energy consumption (kWh/m^3) by at least 20 percent compared with the average performance of the reference over three years or implement renewable energy that meets the criteria established in the energy sector taxonomy For anaerobic systems, such as upflow anaerobic sludge blanket digestion (new and existing), the following additional substantial contribution criteria apply. • Methane leakage from relevant facilities (e.g., in production and storage of biogas, energy generation, digestate storage) is controlled through a monitoring plan. • The biogas produced is used directly for electricity or heat generation, or biomethane is used for injection into the natural gas grid, as fuel for vehicles (e.g., bio–compressed natural gas), or as a raw material in the chemical industry (e.g., for production of hydrogen and ammonia). Activities that facilitate the use of biogas, such as drying, compression, or similar processes, are also eligible. *1 PE = 60gBiochemical Oxygen Demand BDO5/day Decentralised technologies for rural and urban areas Wastewater treatment in rural and urban areas that involve decentralised, low-cost, energy-efficient technologies that can substantially mitigate climate change is directly eligible.

Sector	Water
Activity	**W9. Wastewater treatment systems**
Green	• Decentralised wastewater treatment systems that combine the following technical treatment steps in a modular manner — *Primary treatment: septic tanks for individual households or small communities, sedimentation ponds, settlers, Imhoff tanks* — *Secondary treatment: anaerobic baffled reactors, anaerobic filters, or anaerobic and facultative pond systems* — *Secondary aerobic or facultative treatment: in horizontal gravel filters* — *After treatment: aerobic polishing ponds* • Constructed artificial wetlands for treatment of wastewater, such as: — *Free surface water constructed wetlands* — *Vertical flow constructed wetlands* — *Horizontal subsurface flow wetlands* • Bio-filtration systems using sand and gravel beds for filtration • Waste stabilisation ponds, which are inexpensive and effective for small rural communities • Moving-bed biofilm reactors for small-scale treatment systems Note: It is recommended that community-based sanitation programmes that are site and situation specific accompany these decentralised systems.
Amber (Transition)	• Until 2030, net energy consumption of a wastewater treatment plant is 68 kWh or less per equivalent population per year and is applicable to all wastewater treatment plant capacities. • Until 2030, systems that include biogas flaring (without using the biogas) are eligible only if they are part of a transition programme to another type of use in the medium term (<3 years).
Red (Ineligible)	N.A.
DNSH Requirements	For all treatment systems, a monitoring plan must be implemented that includes the following points. Pollution prevention and control • Develop a water monitoring plan at the plant's inlet and outlet to maintain a unified record. • Verify maximum allowable concentrations for chemical and biological pollutants set by PEPA and regulations associated with the discharge of effluents into water bodies in Pakistan. • Develop a plan for managing solids and sedimentation. Promotion of circular economy • There must be an adequate management plan for the treatment of sludge and waste, promoting circular economy approaches, when feasible. By recovering nutrients, generating energy, and producing useful materials, sludge management can contribute to sustainability, resource efficiency, and environmental protection.

Sector	Water
Activity	**W10. Investments for efficient water use**
ISIC/PSIC	N.A.
Description	Efficient water use reduces demand for raw drinking water from original sources and increases the efficiency of aqueduct and sewer systems. Water consumption savings decreases demand for fresh water, reducing emissions associated with water extraction, supply, and treatment, which reduces GHG emissions and decreases the burden on water resources.
Environmental Objective	Climate change mitigation

Sector	Water
Activity	**W10. Investments for efficient water use**
Methodology	Criteria
Green	The activity must demonstrate compliance with one of the following criteria. • Activities, systems, and technologies that generate at least a 25 percent reduction in annual water consumption by economic activities, such as in the construction sector, industrial processes, buildings with efficient systems, and creation of various products or services • Water reuse in closed systems with the aim of minimising annual water consumption by 25 percent within the facilities and recovering and reusing water in processes (e.g., water-efficient fixtures, rainwater harvesting) • Activities or systems that produce a minimum reduction of 20 percent in annual water consumption per unit of product (e.g., reduction of 20 percent of water use per tonne of beverage produced) Note: The distribution loss must be less than 10 percent for the segment of the network.
Amber (Transition)	Until 2030, the following measures are applicable. • Activities, systems, and technologies that generate at least a 15 percent reduction in annual water consumption in economic activities, such as in the construction sector, industrial processes, buildings with efficient systems, and creation of various products or services • Water reuse in closed systems with the aim of minimising annual water consumption by 15 percent within the facilities and recovering and reusing water in processes (e.g., water efficient fixtures, rainwater harvesting). • Activities or systems that produce a minimum reduction of 10 percent in annual water consumption per unit of product (e.g., reduction of 20 percent of water use per ton of beverage produced) Note: the distribution loss must be less than 20 percent for the segment of the network.
Red (Ineligible)	N.A.
DNSH Requirements	N.A.

Sector	Water
Activity	**W11. Research and development and professional services**
ISIC/PSIC	N.A.
Description	Research; development and implementation of innovative solutions, processes, and technologies; technical advice; and business models designed to reduce, eliminate, or prevent GHG emissions and increase water efficiency. The ability of these solutions to contribute significantly to the mitigation objective of the activities of the water sector must be demonstrated.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	Creation of intangible assets and research, development, and innovation activities that have the objective of promoting compliance with the substantial contribution criteria of the Taxonomy in the water sector are considered directly eligible.
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	N.A.

Information and Communications Technology (ICT)

The ICT industry in Pakistan is projected to reach US$20 billion in sales by 2025 and that urgent attention would be paid to computer literacy, increasing the access of citizens to ICT tools and promoting greater connectivity [63].

According to Pakistan Digital Policy, it is important that government databases and software systems facilitate the sharing of data and knowledge both among themselves and with citizens. In addition, strong ICT infrastructure that can transfer and share large amounts of data and strong cyber-security measures to protect data related to national security that are required. A personal data protection bill that has been drafted to regulate how personal data are stored and processed, requires that data centres adopt robust security measures.

Pakistan's digital policy of 2018 promotes digitalization of key socioeconomic sectors (e.g., agriculture, energy). Connectivity and digital transformation also have direct impacts on society and the environment. The National Cyber Emergency Response Team of Pakistan was created to protect Pakistan´s digital assets, sensitive information, and critical infrastructure from ever-increasing cyber-attacks, cyber terrorism, and cyber espionage. Annex 4 lists the references used to determine the criteria for substantial contributions in the ICT sector.

The activities in this sector are listed below.

Activity	ISIC/PSIC Code
ICT1. Data processing, storage, transmission, and management	J6311
ICT2. GHG-related solutions and software	J6201, J6202

The technical screening criteria for the activities are listed below.

Sector	Information and Communications Technology
Activity	**ICT1. Data processing, storage, transmission, and management**
ISIC/PSIC	J6311
Description	Provision of infrastructure for data processing services and related activities, specialised hosting activities such as web hosting, streaming services, application hosting, application service provisioning, general time-share provision of mainframe facilities to clients, data processing activities such as complete processing of data supplied by clients or generation of specialized reports from data supplied by clients, data entry services
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The activity is eligible if it meets all of the following criteria. • Data centres[22] must have an energy use efficiency of less than 1.5 (power usage effectiveness [PUE][23]), or the power source for data centres must have GHG emissions of less than 100 gCO_2e/kWh in their lifecycle. • The global warming potential of refrigerants used in the data center cooling system must not exceed 675. Note 1: Retrofitting of existing facilities should comply with the above criteria. Note 2: Verify the National Energy Efficiency and Conservation Authority Conservation Policy 2023 to promote sustainable energy use for the ICT infrastructure, encouraging energy-efficient practices.
Amber (Transition)	PUE of retrofitted data centres should be no more than 2.0 (criteria cut-off date: 2030)
Red (Ineligible)	N.A.
DNSH Requirements	The following is a general guide to measures that can be taken to correct or repair damage that the project may cause to other environmental objectives (non-exhaustive list). Promotion of circular economy • A waste management plan is in place to ensure safe disposal of hazardous waste, including e-waste, considering applicable regulations. Other relevant e-waste regulations include E-waste Management Standard Operating Procedures of June 2024 (Sindh), Development of Standard Operating Procedures for E-waste Management Final Report of September 2023 (Punjab), and E-waste Management Plan Punjab Urban Land Systems Enhancement Project (P172945). Pollution prevention and control • Ensure compliance with regulations on fluorinated gases, such as Pakistan's amendment to the Montreal Protocol, which restricts use of fluorinated gases. The Pakistan Telecommunication Authority controls substances related to ICT equipment. • Production of servers, storage devices and network technology must meet the requirements of the national and international standards for servers and data storage products.

22 Pakistan's Cloud First Policy is a government initiative to promote adoption of cloud computing in the public and private sectors so as to prioritize cloud computing solutions for government services and ensure a secure, scalable, efficient ICT infrastructure. The Digital Pakistan policy establishes Tier III and Tier IV standard data centers, including tax relief and subsidies for companies setting up data centers. These policies do not include Energy Efficiency targets.

23 PUE is a metric used to determine the energy efficiency of a data center. It is determined by dividing the total amount of power entering a data center by the power used to run the ICT equipment in it. PUE is expressed as a ratio, with overall efficiency increasing as the quotient decreases toward 1.0 [75]. The PUE of data centers in Pakistan may vary because of outdated infrastructure, unreliable power supply, and lack of knowledge about energy saving practices. Within the last 10 years, the PUE has improved when large-scale, tier-level data centers were updated with the latest equipment, particularly by telecommunications companies.

A PUE of 1.0 is attainable under only the most favorable conditions and is difficult to achieve in Pakistan because of the above-mentioned challenges, but data centers with state-of-the-art equipment with favorable external factors such as regular power supply achieve a PUE between 1.2 and 1.5. Data centers in Pakistan have an average annual PUE of approximately 1.5.

Sector	Information and Communications Technology
Activity	**ICT2. GHG-related solutions and software**
ISIC/PSIC	J6201, J6202
Description	Writing, modifying, testing, and supporting software; designing the structure and content of systems software and writing the computer code necessary to create and implement systems software (including updates and patches), software applications (including updates and patches), databases, and web pages; customizing software (modifying and configuring an existing application so that it is functional within the client's information system environment); planning and designing computer systems that integrate computer hardware, software, and communication technologies; providing on-site management; and operating clients' computer systems and data-processing facilities, as well as related support services. The activity also includes appliances and equipment that optimise energy use using artificial intelligence and Internet of Things systems.
Environmental Objective	Climate change mitigation
Methodology	Criteria
Green	The activity is eligible if it meets one of the following criteria. • ICT solutions that are predominantly used to provide data and analysis that enable GHG emission reductions or improve adaptation and resilience data are directly eligible. • When an alternative solution or technology is available on the market, the data-driven solution and software demonstrates substantial lifecycle GHG emission savings over the best-performing alternative solution or technology. Certified products, systems, and technologies should comply with technical standards for energy-efficient, low-emission technologies set by the Pakistan Standards and Quality Control Authority. Note: An independent third party that transparently assesses how the standard criteria, including those for critical review, have been followed when the value was derived must verify quantified lifecycle GHG emission reductions.
Amber (Transition)	Until 2030, solutions and software that reduce the carbon footprint of the ICT industry by reengineering ICT products and processes to increase their energy efficiency, maximise their use, and minimise their carbon footprint to meet national legal framework are eligible.
Red (Ineligible)	N.A.
DNSH Requirements	The following is a general guide to some measures that can be taken to correct or repair possible damage that the project may cause to other environmental objectives (non-exhaustive list): Promotion of circular economy • A waste management plan must be in place to ensure end-of-life recycling of electrical and electronic equipment. • At the end of its useful life, equipment must undergo preparation for reuse, recovery or recycling operations or appropriate treatment, including disposal of all fluids and selective treatment of waste electrical and electronic equipment. Pollution prevention and control • Ensure compliance with regulations on fluorinated gases. E.g., Pakistan's amendment to the Montreal Protocol restricts use of fluorinated gases. The Pakistan Telecommunication Authority controls substances related to ICT equipment.

Sectors and Activities that Contribute Substantially to Climate Change Adaptation

The impact of climate change in Pakistan has led to unprecedented natural disasters, which have adversely affected livelihoods, infrastructure, food security, and housing, among other aspects. According to the Global Climate Risk Index, Pakistan is ranked as the eighth-most-affected country by climate change, primarily due to the significant increase in damage caused by floods, earthquakes, and storms.

Pakistan is projected to experience warming ranging from 1.3°C to 4.9°C by the 2090s, along with greater frequency and intensity of floods, droughts, and extreme events. Moreover, Pakistan is confronted with some of the highest disaster risk levels in the world, being ranked 18 out of 191 countries. Between 1900 and 2020, more than 32,500 deaths from floods, tropical cyclones and heat waves [64].

For climate change adaptation activities, the substantial contribution criteria are defined using specific metrics and thresholds. These may include quantifiable or verifiable metrics, such as percentage savings in freshwater use or the design specifications for stormwater drains based on minimum return periods. Alternatively, they may involve a set of qualitative requirements linked to applicable guidelines, standards, and regulations, such as nature-based solutions or wetland restoration. These criteria are designed to provide sufficient flexibility, allowing for the integration of diverse contexts, including ecosystems and biomes.

In addition, technical criteria for certain activities are incorporated based on demonstrating climate risk reduction or resilience enhancement through an assessment (see Box 2 on Climate Risk Assessment). The Taxonomy also identifies some activities and measures that are automatically eligible, without having to meet any criteria, where the risk of maladaptation is known to be sufficiently low.

Finally, the Taxonomy identifies other technical criteria for adapted activities and activities that enable adaptation in a transversal way. As adaptation to climate change is specific to each context and region, this option can be applied to activities across all sectors.

Box 2. Climate Risk Assessment

Where criteria necessitate a risk assessment to demonstrate climate risk mitigation and resilience enhancement, both quantitative and qualitative technical analysis may be employed if the project is considered high risk. For projects classified as low to moderate risk, a qualitative analysis should be considered.

Below are several key frameworks and models for climate risk assessment.

- National policy guidelines: These guidelines establish standard benchmarks for conducting multi-hazard vulnerability and risk assessments. They specify the procedures to be followed and outline the datasets and tools required for such assessments.
- Natural catastrophe models: These models offer probabilistic risk modelling covering for nine hazards based on the return period, utilizing services acquired from the Pakistan Space and Upper Atmosphere Research Commission.
- National Climate Change Policy: This policy identifies key climate risks, such as extreme weather events, glacial melting, and water scarcity. It includes a vulnerability assessment of the water, agricultural, energy, and health sectors.
- National Disaster Risk Management Framework: Developed by the National Disaster Management Authority, this framework focuses on climate risk assessments for disaster-prone areas, including hazard mapping, early warning systems, and community-based risk assessments.
- Risk assessment standards: Standards such as ISO 14090 (Adaptation to Climate Change) and ISO 31000 (Risk Management) provide a structured approach to identifying, assessing, and managing climate risks.

Some of the most common climate hazards in Pakistan and methodologies that can be used for hazard-specific assessments.

- Flood risk assessment: Hydrologic Engineering Center River Analysis System and the hydrodynamic modelling software MIKE Flood to simulate flood scenarios

(Continued on the next page)

- Glacial and snowmelt risks: Glacial Lake outburst flood risk analysis in the Karakoram and Himalayan regions under the Glacial Lake Outburst Flood-II Project of the United Nations Development Programme and the Ministry of Climate Change
- Heatwave and urban climate risks: Karachi's Heatwave Management Plan, which integrates risk assessment into public health responses
- Drought risk assessment: Tools such as the Standardized Precipitation Index and Palmer Drought Severity Index to monitor and analyse drought conditions

Indicators to assess during risk and vulnerability studies may vary depending on sector, activity, location, and context, although they should respond to the impacts that may occur, such as:

- Economic: Loss of value of assets, loss of income
- Social: Population displacement, negative health effects, gender inequality, socioeconomic inequality, limited availability of and access to social and informational resources

Environmental: Loss or degradation of ecosystems and their services, biodiversity

Economic activities and measures that meet the climate change adaptation objective are listed below.

Water

The water sector is extremely vulnerable to the impacts of climate change, which can have cascading effects on other sectors. For instance, reduced rainfall can lead to significant agricultural losses, thereby affecting food security and economic stability.

Water security is of paramount importance in strengthening Pakistan´s economy. Groundwater serves as a critical resource, supplying 90 percent of domestic water needs in rural areas and 70 percent of the national water requirements [65].

Activity	Criteria
WA1. Investments for efficient water use Decreasing water consumption decrease demand for fresh water, which reduces the load on water resources and increases the country's water security.	The following activities, systems and technologies are eligible: • Those that reduce annual water consumption of economic activities by at least 25 percent, for example, in the construction sector, industrial processes, buildings with efficient systems, creation of different products or services • Water recovery or reuse processes in closed systems with the aim of minimising annual water consumption within the facilities by 25 percent • Those that produce a minimum reduction of 20 percent in annual water consumption per unit of product **DNSH requirements:** Projects must be in line with national regulations: National Water Conservation Strategy for Pakistan and Pakistan's National Water Policy.

Activity	Criteria
WA2. Ecosystem improvement projects in water catchment areas (mainly in the Indus River basin) These types of projects are designed to generate better conditions for water catchment areas for the supply of the population. Activities such as conservation of watersheds, increase in forest cover, and monitoring of water quality are integrated into these projects, among other actions whose main objective is to improve soil quality to promote supply and filtration of water to aquifers, in addition to contributing to generation of carbon sinks.	The activity is eligible if it meets the following criteria: • Forest management plan or equivalent instrument: The activity takes place in an area that is subject to a forest management plan or equivalent management instrument that demonstrates a clear objective of soil and water protection, biodiversity conservation and related ecosystem services, including social issues (Annex 7). It includes an analysis of impacts and pressures on habitat conservation, logging conditions, and other activities that affect conservation objectives, such as hunting and fishing; agricultural, pastoral, and forestry activities; and industrial, mining, and commercial activities in the project area. All projects should follow the National Forest Law and Policies in Pakistan, including the Sustainable Forest Management to Secure Multiple Benefits in Pakistan's High Conservation Areas project of the Ministry of Climate Change and Environmental Coordination.[24] The forest management plan or equivalent instrument covers a period of 10 years or more and is continuously updated. The activity does not involve degradation of lands with high carbon stocks. The forest management plan or equivalent instrument provides monitoring to ensure the accuracy of the information contained in the plan regarding data related to the affected area. • **Audit:** Within two years of the start of the activity and every 10 years thereafter, any of the following verify compliance of the activity with the criteria of substantial contribution to the environmental objectives. — *Competent national authorities* — *An independent third-party certifier, at the request of the national authorities or the operator of the activity. To reduce costs, audits can be conducted in conjunction with any forestry or climate certification or other audit. The independent third-party certifier must not have any conflict of interest with the owner or the funder and must not be involved in the development or operation of the activity.* • **Group assessment:** Compliance with forest management plan requirements may be verified at the level of a sufficiently homogeneous group of participants to assess the sustainability risk of the forestry activity, provided that all participants have a longstanding relationship with each other and participate in the activity and that the group of those holdings remains the same for all subsequent audits. Personnel qualified in restoration or preservation of functioning of ecosystems must conduct projects. **DNSH requirements:** Projects must be in line with national regulations: National Water Conservation Strategy for Pakistan and Pakistan's National Water Policy

24 This project focuses on seven forest landscapes (145,300 hectares) containing three vulnerable and important forest types: temperate coniferous forests in Khyber Pakhtunkhwa, dry scrub forests in Punjab, and riverine forests in Punjab and Sind.

Activity	Criteria
WA3. Stormwater management Stormwater is natural precipitation. Effective stormwater management relies on provision for stormwater runoff mitigation and transport and water quality treatment.	**Large-scale projects (>1,500 inhabitants)** • Systems should be designed considering changes in climate, rainfall regime, and intensity. • For construction of these systems, refer to the National Water Policy and the Building Code of Pakistan **Small-scale projects (<1,500 inhabitants)** • Systems should be designed considering changes in climate, rainfall regime, and intensity. • Systems should be prioritised based on the use of green infrastructure such as sustainable urban drainage systems. (These systems must comply with criteria for the activity of sustainable urban drainage systems in WA6.) **DNSH requirements:** A management plan must be in place for waste, sludge, or sediment generated in the system (pollution prevention and control).
WA4. Nature-based systems for prevention of and protection against drought or flooding Nature-based water resource management systems that are managed to collect, store, treat, or distribute water or to buffer floods or droughts include natural and nature-based features, processes, and functions as an integral part of responding to water-related needs.	The activity is eligible if it meets the following criteria. • The activity is identified as a flood- or drought-risk-reduction measure in a river basin–scale water uses and protection management plan or coastal integrated zone management plan. These plans pursue flood and drought risk management objectives to reduce adverse consequences, where appropriate, for human health, the environment, cultural heritage, and economic activity. • The risks of environmental degradation related to preservation of water quality, prevention of water stress, and prevention of deterioration of the status of the affected water bodies are identified and addressed to achieve good water status and good ecological potential in accordance with a river basin management plan developed for potentially affected water bodies in consultation with relevant stakeholders. • The activity includes nature restoration or conservation actions with specific benefits to the ecosystem and a clearly defined timeline. Local stakeholders are involved in the planning and design phase. The activity considers the National Biodiversity Strategy and Action Plan and the 2022 Pakistan Floods Response Plan • A monitoring programme is established to evaluate the effectiveness of a nature-based solutions plan in improving the status of the affected water body, achieving conservation and restoration goals, and adapting to changing climate conditions. The programme is revised following the regular approach of river basin management plans (including drought management plans, where appropriate) and flood risk management plans. **DNSH requirements** • The activity does degrade the terrestrial and marine environment with high carbon stocks (climate change mitigation). This must be checked through an environmental impact assessment or similar study. • The activity is not detrimental to recovery or maintenance of populations of protected species or affected and protected habitats and prevents the introduction of invasive alien species or manages their spread (protection of healthy ecosystems and biodiversity). • Construction of any civil work must have a construction and demolition waste management plan ensuring implementation of best environmental practices.

Activity	Criteria
WA5. Wetland restoration Wetland restoration allows the recovery of ecosystems for various purposes: conservation of diversity, creation of habitat, improvement of water quality, protection of coastal zones and productive projects. For some of these purposes, restoration of physical conditions of the site may be sufficient to allow hydrophilic vegetation to be established; in other cases, it is necessary to modify additional parameters, including topography and substrate characteristics, and even to introduce species.	The activity is eligible if it meets the following criteria. • **Restoration plan:** The area is covered by a restoration plan that is consistent with the principles and guidelines of the Ramsar Convention on wetland restoration; complies with the Pakistan National Wetlands policy; carefully considers local hydrological and soil conditions, including dynamics of soil saturation and changing aerobic and anaerobic conditions; and provides for monitoring to ensure accuracy of information contained in the plan regarding data related to the area involved. • **Climate benefits analysis:** A climate benefits analysis is conducted that demonstrates a net balance of GHG emissions and removals generated by the restoration activity over a 30-year period (project scenario) compared with a baseline reference year in the absence of the restoration activity (actual scenario). Analysis of climate benefits is based on transparent, accurate, consistent, complete, comparable information and covers all carbon pools (including aboveground biomass, groundwater biomass, dead wood, leaf litter, soil). For coastal wetlands, the climate benefits analysis considers projections of projected relative sea-level rise and the potential for wetlands to migrate. • **Guarantee of permanence:** the permanence of the wetland condition of the area in which the activity takes place is guaranteed by one of the following measures. — *The area is designated to be conserved as a wetland and cannot be converted to other land use.* — *The area is classified as a protected area.* — *The area is subject to a legal or contractual guarantee that it will remain a wetland.* • **Audit:** Within 2 years of the start of the activity and every 10 years thereafter, compliance of the activity with the criteria of substantial contribution to the environmental objectives is verified by — *the competent national authorities* — *or an independent third-party certifier at the request of the national authorities or the operator of the activity. To reduce costs, audits can be performed in conjunction with any forestry, climate certification, or other audits. The independent third-party certifier must not have any conflict of interest with the owner or the funder and must not be involved in the development or operation of the activity.* • **Stakeholder assessment:** Compliance with the criteria may be verified at the level of a sufficiently homogeneous group of stakeholders to assess the sustainability risk of the forestry activity, provided that all participants have a long-standing relationship with each other and participate in the activity and that the group of those holdings remains the same for all subsequent audits. Note: Personnel qualified in restoration or preservation of the functioning of ecosystems must conduct projects. **DNSH requirements:** Projects must be in line with national regulations: Pakistan National Wetlands Policy, Pakistan Wetlands Programme, and National Biodiversity Strategy and Action Plan.

Activity	Criteria
WA6. Sustainable Urban Drainage Systems Sustainable urban drainage systems are stormwater management and urban planning techniques designed to reduce the amount of water in the final water discharge and improve the quality of the water discharged into the natural environment, achieving integrated water cycle management solutions linked to environmental protection of receiving waters. This activity includes construction, expansion, operation, and renovation of facilities of these systems.	The activity leads to stormwater retention in a specific area or an improvement in water quality and must meet the following criteria: • Construction and operation of sustainable urban drainage systems are integrated into urban drainage and wastewater treatment systems. In addition, it should be demonstrated through a flood risk management plan or other relevant urban planning instruments that the activity contributes substantially to achieving the adequate water quality and ecological potential of surface and groundwater bodies or to preventing deterioration of water bodies that already have adequate water quality. Design of the sustainable urban drainage system achieves at least one of the following effects. • A quantified percentage of stormwater in the catchment area of the drainage system is retained and discharged with a staggered delay in receiving water bodies. • A quantified percentage of pollutants, including oils, heavy metals, and hazardous chemicals, are removed from urban runoff before discharge into receiving water bodies. • The maximum runoff flow is reduced by a quantified percentage, with a return period in line with the requirements of flood risk management plans or other local provisions in force. **DNSH requirements:** Projects must be in line with national regulations: 2022 Pakistan Floods Response Plan.
WA7. Rainwater harvesting systems	Automatically eligible
WA8. Expansion of stormwater systems Expansion of stormwater systems for rainwater conduction, considering the effects of climate change, such as an increase in rainfall intensity	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
WA9. Aquifer recharge system with treated rainwater It serves as a resilient strategy to address water scarcity, reduce urban flooding, and enhance water security in response to changing precipitation patterns, prolonged droughts, and increased water demand due to climate change.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity) • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment. • Establish a risk mitigation plan.

Activity	Criteria
WA10. Improvements in stormwater treatment infrastructure Improvements in stormwater treatment infrastructure such as sludge settling systems and removal of pollutants and waste	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity) • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
WA11. Remote water quality monitoring systems Technology-based solutions such as remote sensing that continuously or periodically measure key water quality parameters.	Refer to the criteria under the ICT sector if applicable. Otherwise: • Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity) • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
WA12. Massification of drip irrigation systems in the agricultural sector Widespread adoption and scaling-up of drip irrigation technology across the agricultural sector, as a strategic response to increasing water scarcity, erratic rainfall, and the need to sustain agricultural productivity under changing climatic conditions.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity) • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
WA13. Installation and operation of water management system Installation and operation of water management system for agricultural use in freshwater-stressed districts (including rainwater collection, water recycling, flood-proof warehousing)	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity) • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
WA14. Protection of nature and natural capital For instance, wetlands; and Ramsar sites;[25] marine and coastal ecosystems (e.g., coastal or mangrove forests; salt marshes; estuaries; freshwater, brackish, and saline lagoons; dune systems; salt or mudflats; rocky coasts; barrier islands; meadows; and seagrass beds)	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.

25 Astola Island, Indus Delta, Jiwani, Miani Hor, Nariri-Jaboh Lagoon, Ormara Turtle Beach, Rann of Kutch

Activity	Criteria
WA15. Water management and storage Installation of reservoirs, rainwater harvesting, runoff-harvesting technologies, among others.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
WA16. Monitoring and meteorological systems Technology-based solutions to monitor weather phenomena	Automatically eligible
WA17. Early warning systems Early warning systems for storms, droughts, floods or dam failure, and water quality or quantity monitoring processes	Automatically eligible
WA18. Wastewater treatment systems with nature-based solutions Treatment approaches that use natural processes, ecosystems, or green infrastructure, such as wetlands, to purify wastewater before it is discharged or reused.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
WA19. Investments to increase the resilience of drinking and wastewater infrastructure Strategic measure aimed at strengthening the capacity of water supply and sanitation systems to withstand, adapt to, and recover from climate-related stresses and shocks—such as floods, droughts, sea-level rise, and extreme weather events.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
WA20. Emergency systems for water storage and distribution Mechanisms designed to ensure temporary but reliable access to safe drinking water during climate-induced disruptions such as droughts, floods, earthquakes, or infrastructure failures.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.

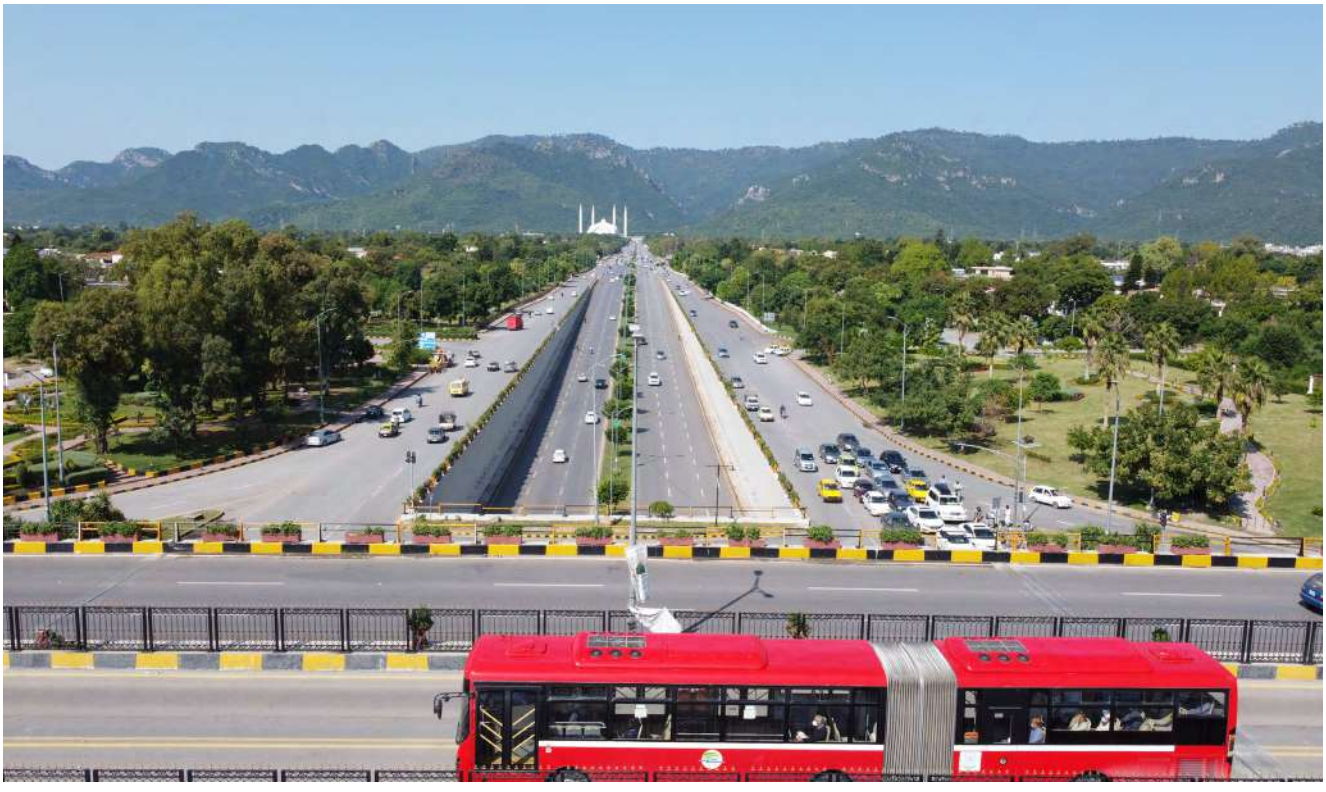
Activity	Criteria
WA21. Capacity enhancement and awareness raising for water management Building the knowledge, skills, institutional strength, and public engagement necessary to manage water resources sustainably and equitably, particularly in the face of climate change impacts like droughts, floods, and shifting rainfall patterns.	Automatically eligible

Transport

The manifestation of physical risks associated with climate change may have significant implications for the transport sector. To mitigate the effects of climate change, it is imperative that the transport sector demonstrates resilience to the impacts of extreme weather conditions and adapts accordingly.

Activity	Criteria
TA1. Investments in increasing the physical resilience of transport systems and infrastructure to extreme weather events Involve strengthening the design, construction, maintenance, and operation of roads, bridges, railways, ports, and airports to withstand and recover from extreme weather events such as floods, heatwaves, storms, and sea-level rise (for example, improving road drainage to prevent damage from excessive rainfall)	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
TA2. Restoration of transport infrastructure after extreme events considering the climate vulnerability Process of repairing, rebuilding, or upgrading damaged transport systems in a way that accounts for future climate risks—rather than simply restoring them to their original condition	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.

Activity	Criteria
TA3. Research and studies to determine vulnerability factors in transport networks Research and studies to determine vulnerability factors in transport networks that may affect nodes, lines, and operations and identification of possible interventions to reduce such impacts	Automatically eligible
TA4. Updating of building standards, maintenance practices, and other building elements, incorporating strategies to enhance resilience Involves revising construction codes, operational protocols, and planning frameworks to integrate climate resilience principles, ensuring that infrastructure and buildings can withstand current and future climate-related risks such as heatwaves, flooding, storms, and sea-level rise.	Automatically eligible
TA5. Development of airport infrastructure in isolated areas for establishing connectivity within communities when other modes such as land, rail, and river are inadequate Planning, construction, and operation of airports or airstrips in remote or hard-to-reach regions where traditional modes of transport. Such development ensures continuous access to essential goods, services, healthcare, and emergency support, particularly during extreme weather events or natural disasters that can isolate communities.	• This infrastructure must use low-carbon energy and vehicle fleets that meet the mitigation thresholds defined in the transport sector for their operations. • Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.



Information and Communications Technology (ICT)

The ICT sector plays an important role in facilitating the adaptation of other sectors and activities to climate change and making systems resilient. Connectivity and digital transformation also directly affect societies and the environment.

Some of the impacts of climate change could affect sector activities and areas in which the ICT sector can play an important role in adaptation.

Activity	Criteria
ICTA1. Telecommunication systems Telecommunication systems are crucial during weather emergencies and to provide digital services to communities. These systems often use stand-alone fossil fuel generators to operate, so transitioning to alternative sources such as low-carbon clean energy would reduce GHG emissions.	The activity is eligible if it meets one of the following criteria. • All telecommunications systems that improve connectivity or are used to implement solutions related to climate change mitigation (e.g., digital solutions to increase efficiency of energy grids) or adaptation to climate change (e.g., antennas and networks to establish early warning systems related to climate disasters) are eligible. • Increases resilience of telecommunications infrastructure, demonstrating reduction of climate risks or increase in resilience through a quantitative and qualitative technical analysis whenever feasible **DNSH requirements** • Lower electricity consumption base on demand: Cellular radio bases with more-efficient technologies than existing systems and modernization of existing equipment • Energy used for telecommunications systems must come from sources that meet the requirements set out in the energy sector in Pakistan's Green Taxonomy. • A waste management plan to ensure end-of-life recycling of electrical and electronic equipment (promotion of circular economy) • At the end of its useful life, the equipment must undergo preparation for reuse, recovery, or recycling operations or appropriate treatment, including disposal of fluids and selective treatment of waste electrical and electronic equipment (promotion of circular economy).
ICTA2. Power demand management of data centres and reduction in their vulnerability to climate change Strategies to withstand climate-related risks such as heatwaves, floods, storms, and power outages, ensuring reliable service and minimizing disruptions.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.

Activity	Criteria
ICTA3. Disaster warning and monitoring systems Technology-based solutions designed to detect, track, and communicate impending natural hazards such as floods, storms, droughts, earthquakes, and other extreme events.	Automatically eligible
ICTA4. Intelligent data collection, monitoring, analysis, automation, climate Modelling, forecasting for early warning systems, and decision making.	Automatically eligible
ICTA5. Climate modelling, planning, and resilience of urban infrastructure Scientific tools and simulations to understand current and future climate conditions, such as temperature, precipitation, sea-level rise, and extreme weather events.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
ICTA6. Climate change research, climate change scenario modelling, urban and coastal flood simulation, climate risk analysis Vulnerability, exposure and hazard mapping	Automatically eligible
ICTA7. Installation of thermal insulation in data centres to mitigate high temperatures Involves applying materials and systems designed to reduce heat gain or loss within the facility. This helps maintain stable internal temperatures, minimizes cooling loads, and enhances energy efficiency	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
ICTA8. Construction and operation of climate ICT infrastructure for agricultural productivity Refers to the design, deployment, and management of digital tools and networks that collect, process, and disseminate climate-related information to support farmers in enhancing productivity and resilience.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.

Activity	Criteria
ICTA9. Modernisation of water pricing (e-Abiana framework[26]) by digitising the e-Abiana assessment and collection system and creating a financial diversification programme for irrigation departments to increase revenue	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.

Construction

The construction plays a critical role in climate change adaptation by shaping how infrastructure withstands and responds to environmental stressors. Considering high vulnerability of the sector to climate change, it is imperative to allocate investments toward measures that integrate climate considerations as a cross-cutting component in the development and enforcement of design and construction standards. Additionally, it is necessary to implement risk management and vulnerability reduction strategies aimed at increasing its capacity to mitigate the expected impact of climate change. The construction sector must. Adaptation strategies are strictly related to the context in which buildings are located.

Activity	Criteria
CA1. Design and construction of bioclimatic buildings Including resilient health and education infrastructure) and urban-scale interventions that adapt to the effects of climate change (e.g., floods, extreme temperatures, droughts	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
CA2. Reinforcement and stability of buildings to withstand hurricanes and severe storms or other climate change effects Strengthening structural elements and using design techniques to ensure buildings remain safe, functional, and durable during and after extreme weather events like hurricanes, severe storms, floods, and other climate-induced hazards.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.

26 e-Abiana is a digital mechanism for collection of water charges and fines that the Punjab Information Technology Board developed for the Punjab Irrigation Department (see e-Abiana System Developed by PITB for Punjab Irrigation Department | PITB).

Activity	Criteria
CA3. Improvement of drainage systems (to consider changes in rainfall regimes) Involves upgrading and redesigning urban and rural water drainage infrastructure to effectively manage increased variability, intensity, and volume of rainfall caused by climate change.	Refer to the criteria for stormwater management in the water sector if applicable. On the contrary, • Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
CA4. Increase in green spaces to reduce heat accumulation, rainwater harvesting, and surface runoff Nature-based solution that helps to moderate urban heat, capture and utilize rainwater, and reduce surface runoff, addressing multiple challenges posed by climate change.	Automatically eligible. For activities related to sustainable urban drainage systems, refer to sustainable urban drainage system criteria in the water sector.
CA5. Implementation of green infrastructure Implementation of green infrastructure to reduce landslide and flood risks (avoidance of building in areas with high probability of flooding or wildfires)	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
CA6. Water management, collection, and recycling to compensate for water scarcity Integrated practices and technologies aimed at efficiently using, capturing, storing, and reusing water resources to address shortages caused or worsened by climate change.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
CA7. Adaptation of existing buildings or intervention to reduce inefficiency in use of resources such as energy and water Involves retrofitting, upgrading, or modifying structures and their systems to improve resource efficiency while enhancing resilience to climate change impacts such as heatwaves, droughts, and extreme weather.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.

Activity	Criteria
CA8. Coastal protection and reinforcement Coastal protection and reinforcement through construction solutions and relocation of coastal settlements, port infrastructure, and routes compromised by coastal erosion or sea level rise, complemented by nature-based solutions (e.g., mangrove reforestation)	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
CA9. Construction of wave barriers, dikes, or floodgates that physical risk assessments or other technical studies have shown to be resilient Infrastructure mitigates the impact of rising sea levels, extreme storms, and heavy rainfall by reducing flood risk, safeguarding communities, and preserving critical infrastructure.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
CA10. Building of sea walls on low-lying islands to stop coastal erosion Preserving the habitability and economic viability of low-lying islands facing rising sea levels and more frequent severe weather events	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
CA11. Restoration and reinforcement of infrastructure affected by catastrophes due to extreme weather events Returns infrastructure to functional status and incorporates enhanced designs and materials to improve resilience against future climate-related disasters, reducing vulnerability and ensuring continuity of services.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
CA12. Development of structures to reinforce or restore resilience of buildings affected by climate change events	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.

Disaster Risk Management

To mitigate the effects of climate change, it is essential to prioritize investments in strengthening emergency response systems and risk management services. Adaptation measures are crucial for identifying opportunities to increase resilience and developing tailored responses to climate threats.

For nature-based solutions please refer to the criteria for WA4 activity in the water sector.

Activity	Criteria
DRA1. Emergency services, including • Disaster response coordination for establishment and operation of assessment, coordination, or preparedness facilities and teams such as permanent emergency response coordination centres and on-site operations coordination centres in the location of an emergency • Emergency health services (emergency first aid, medical care of patients in the field) in temporary field hospitals, including military hospitals and medical facilities that treat in- and out-patients affected by a climate emergency • Disaster relief (ad-hoc on-location post-disaster relief activities such as setting up and managing evacuation centres in coordination with existing structures, local authorities and international organizations until handover to local authorities or humanitarian organizations) • Search and rescue (e.g., searching for, locating, and rescuing people in distress or imminent danger; trapped by flooding; located under debris; lost, stranded, or isolated with no means of evacuation; missing and unaccounted for on land and in water) • Hazardous materials response (e.g., detection and isolation of hazardous materials) • Firefighting and fire prevention (e.g., administration and operation of regular and auxiliary fire brigades) • Technical protection response and assistance to a climate hazard	Automatically eligible

Activity	Criteria
DRA2. Design, construction, extension, rehabilitation, upgrade, and operation of flood risk prevention and protection infrastructure by: Structural measures, including: • Dikes, river embankments • Sea defence dikes, storm-surge barriers, seawalls, and breakwaters • On- and off-line buffer basins for flood detention and control in natural and artificial drainage networks • Measures to control floods by increasing retention capacity of catchment areas (e.g., distributed buffer basins, sewer overflow structures) • Hydraulic structures to regulate water flow (e.g., pumping stations, sluices, gates) • Sediment control structures • Elevated roads and bridges in flood-prone areas to ensure that communication between affected areas remains intact for speedy response, evacuation, and rehabilitation Non-structural measures, including: • Flood awareness–raising campaigns • Flood modelling and forecasting, flood hazard and risk mapping • Spatial planning in flood-prone areas to reduce flood risk (e.g., by applying restrictions to land uses and enforcing protection criteria through building codes) • Flood early warning systems	For structural measures: • Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment. Non-structural measures are automatically eligible.
DRA3. Mapping existing irrigation infrastructure Especially flood embankments, for effective flood monitoring and management	Automatically eligible
DRA4. Hydrological modelling and flood-plain mapping and zoning of the Indus River system Using climate change scenarios to estimate projected flood levels	Automatically eligible
DRA5. Development of capacity based on remote sensing for monitoring changes in glaciers and snow cover and in land cover in various agro-ecological zones	Automatically eligible
DRA6. Investments to ensure that infrastructure, including telecommunications, power, utilities, and transport, are resilient in the face of climate change impacts, particularly extreme weather events Investments aim to reduce vulnerability, minimize service disruptions, and protect economic and social well-being by enhancing the durability and flexibility of infrastructure.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.

Activity	Criteria
DRA7. Upgrade of public evacuation shelters and provision of comprehensive awareness training to ensure their effective use Improving the physical infrastructure, facilities, and resources of designated safe spaces to better protect and accommodate populations during climate-related disasters such as floods, hurricanes, and heatwaves.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
DRA8. Development of policies such as affordable crop insurance schemes for disaster-related losses Creating and implementing regulatory frameworks and financial mechanisms that provide farmers with access to insurance products protecting them against losses caused by climate-related disasters such as droughts, floods, storms, and pests.	Automatically eligible
DRA9. Emergency and natural disaster monitoring and response systems Reducing vulnerability and enhancing community resilience by providing early warnings, facilitating rapid emergency responses, and supporting recovery efforts amid increasing frequency and severity of climate-related disasters.	Automatically eligible
DRA10. Development and deployment of early warning system for heat waves to reduce associated illnesses and deaths Specialized monitoring and communication tools designed to detect impending extreme heat events and provide timely alerts to populations and health services.	Automatically eligible
DRA11. Early warning systems, structural interventions, and community preparedness for Glacial Lake Outburst Floods (GLOFs) Use remote sensing, ground-based sensors, and hydrological data to track lake levels, glacier stability, and signs of potential breach.	• For structural measures such as artificial drainage of glacial lakes, construction of check dams and barriers, reinforcement of embankments and elevation of key infrastructure, and tunnel diversion systems, follow criteria set out in DRA2 for “structural measures” • Early warning Infrastructure, such as automated sensors and sirens to detect and alert to water level changes, weather monitoring stations to track precipitation and temperature trends, satellite monitoring and remote sensing for real-time tracking of glacial lakes are directly eligible. • Community-based disaster risk measures, including training locals in emergency evacuation and rescue operations, and creating safe shelters and evacuation routes in high-risk areas are directly eligible.

Manufacturing

To mitigate the effects of climate change, it is imperative that the manufacturing sector enhances its resilience against the impacts of extreme weather events. This resilience is particularly crucial in ensuring the consistent availability of raw materials, energy, and water resources. The activities and measures in the manufacturing sector aimed at achieving the objective of climate change adaptation are shown below.

Activity	Criteria
MA1. Sustainable management of river basins and protection of aquifers (e.g., for water-intensive industries such as food and beverage)	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
MA2. Cold storage infrastructure for agricultural raw materials Cold storage infrastructure for agricultural raw materials to reduce waste in supply chains and planning in low-productivity seasons	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
MA3. Investments in industrial infrastructure resilient to floods or extreme weather events Investments aim to minimize operational disruptions, protect assets and workforce safety, and ensure business continuity despite increasing climate hazards.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
MA4. Development and implementation of sustainable production plans Development and implementation of sustainable production plans that are respectful of adjacent vulnerable communities.	Automatically eligible

Activity	Criteria
MA5. On-site renewable energy production and reduction of grid dependence Reducing dependence on the grid enhances energy security and resilience by minimizing vulnerabilities to grid failures caused by extreme weather events, natural disasters, or climate-induced disruptions.	The activity must meet the criteria established under the energy sector for the mitigation objective and the following criteria. • Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
MA6. Production and supply of materials and equipment needed for disaster relief. Ensure a reliable and timely supply chain for these resources is critical to enhancing preparedness, reducing response times, and minimising the adverse impacts of increasingly frequent and severe disasters.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
MA7. Implementation of sustainable procurement practices and services to increase supply chain efficiency	• Procurement policies must include the criteria and requirements established for the activities covered in the Taxonomy for suppliers. • Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.

Energy

To mitigate the effects of climate change, the energy sector must be resilient to the impacts of extreme weather events that could lead to disruptions in the service, higher energy tariffs (increase of operational costs), yield capacity, among others, and implement measures to adapt the sector accordingly.

Activity	Criteria
EA1. Underground wiring for electricity transmission and distribution systems in areas vulnerable to storms Enhance the resilience and reliability of electricity transmission and distribution systems by reducing outages and damage caused by storms, thereby ensuring continuous power supply and improving public safety.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
EA2. Water management and storage for hydroelectric plants Maintain operational stability despite variability in rainfall, droughts, floods, and other climate impacts. Supporting energy security and reducing vulnerability to water-related disruptions.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
EA3. Investments in increasing resilience of energy systems (e.g., hydroelectric) to climate change effects (e.g., drought)	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
EA4. Flood protection for utility systems Maintain essential services during and after flood events, minimise service disruptions, and reduce economic and social impacts on communities.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
EA5. Energy demand management systems Enhance the resilience of energy systems by reducing the risk of blackouts, lowering operational costs, and minimising environmental impacts. It also supports the integration of renewable energy sources and helps communities adapt to climate-driven changes in energy needs.	Automatically eligible

Activity	Criteria
EA6. Energy storage systems Managing fluctuations in energy supply caused by climate-induced disruptions (e.g., storms, heatwaves), ensuring continuous power availability during outages, and facilitating the integration of intermittent renewable energy sources.	Automatically eligible

Waste

To mitigate the effects of climate change, it is essential for the waste sector to minimise public health risks associated with the impacts of climate change on waste collection and management. The activities and measures covered under this sector for the objective of climate change adaptation are shown below:

Activity	Criteria
WSA1. Flood prevention measures in waste management plants Measures to increase the resilience of waste management infrastructure against extreme weather, reducing risks of hazardous waste leaks and service disruptions.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
WSA2. Investments in fire and landslide reduction and control due to increases in temperature or rainfall Protect waste infrastructure by reducing the frequency, intensity, and impacts of fire and landslide hazards intensified by hotter, drier conditions and extreme rainfall events.	• Demonstrate climate risk reduction or resilience enhancement through a qualitative study (in the case of low or moderate risk to the asset or activity) or a qualitative or quantitative assessment (in the case of high risk to the asset or activity). • Consider all material hazards and establish an adaptation plan to demonstrate that the measure or activity mitigates the assessed climate risks over the lifetime of the project or investment.
WSA3. Investments to reduce amount of plastic waste entering the marine environment Maintain the health and resilience of marine and coastal ecosystems, which provide natural protection against climate impacts like storms and sea-level rise.	• Demonstrate and quantify the expected impacts during the project life span. • Establish a risk mitigation plan.

Activity	Criteria
WAS3. Implementation of early warning and leakage detection systems Technologies and processes designed to identify and alert communities to potential hazards or infrastructure failures (e.g., methane leaks in biogas plants)	Automatically eligible
WSA4. Investments that promote use of organic waste to replace synthetic fertiliser with organic fertiliser Systems and infrastructure to convert organic waste into organic fertilisers like compost or biofertilisers.	Automatically eligible, although for activity related to production of compost, apply corresponding criteria in the waste sector under the mitigation objective.
WSA5. Use of waste for biogas production to replace firewood in rural households, considering minimisation of methane leaks in design and operation	Automatically eligible

Other economic activities and assets across all sectors to determine their substantial contribution to the climate change adaptation objective:

The PGT includes transversal substantial contribution criteria to identify adapted activities and activities that enable adaptation for all sectors, based on investments required, such as:

- **Adapted activities** that demonstrate reduction of material physical climate risks and support systemic adaptation without hampering adaptation efforts of other people, nature, and assets
- **Activities that enable adaptation**, reducing material physical climate risk in other economic activities or address systemic barriers to adaptation

To be eligible, economic activities and assets must comply with all the general substantial contribution criteria outlined below.

General Substantial Contribution Criteria for Adapted Economic Activities	
Criteria	**Sub-criteria**
1. Reduction of physical and material climate risks of economic activities and assets Economic activity must assess physical and material climate risks associated with economic activity. If the assessment reveals a substantial impact of climate change on the activity, a detailed adaptation plan should be developed to address how to manage the identified climate risks. The plan should be flexible to adapt to potential changes.	**1.1. The economic activity includes physical and non-physical measures designed to reduce, as much as possible and based on best effort, physical climatic risks material to that activity that have been identified through a risk assessment.** The criteria for risk assessment can be qualitative or quantitative, depending on level of risk. For low-risk projects (qualitative technical analysis), criticality or vulnerability must be identified and actions to mitigate risks developed. For moderate-risk projects (qualitative technical analysis), criticality or vulnerability must be identified and an action narrative developed with stakeholder consultation to develop actions to mitigate risks. For high-risk projects (qualitative and quantitative), qualitative and quantitative criteria should be applied, such as identifying criticality or vulnerability; developing a narrative with stakeholder consultation; and quantifying risks to develop actions that mitigate risks. **1.2. The risk assessment should have the following characteristics.** • Consider current weather variability and future climate change projections and scenarios, including uncertainty. • Be based on a robust analysis of available climate data and information on various future climate scenarios. • Be consistent with the expected duration of the economic activity or the useful life of the asset. — *For activities and assets with an expected duration or useful life of less than 10 years, the assessment is made using updated climate projections at the smallest appropriate scale (five years).* — *For all other activities, the assessment is made using the most-advanced, highest-resolution climate projections available in the country that are consistent with the expected duration or useful life of the activity or asset, including at least 10 to 30 years for large investments.* — *Future scenarios include the shared socioeconomic trajectories SSP5 and SSP2 and the concentration trajectory RCP8.5 representative of the Intergovernmental Panel on Climate Change.* • Consider potential unintended consequences or side effects. **1.3. If the risk assessment reveals that climate change significantly affects the activity or asset, a corresponding adaptation plan should be defined indicating how the identified climate risks will be managed.**

General Substantial Contribution Criteria for Adapted Economic Activities	
Criteria	**Sub-criteria**
2. Support for adaptation of the system Economic activity and adaptation measures support systemic adaptation[27] and do not hamper adaptation and disaster risk reduction efforts of other people, nature, and assets.	**2.1. Economic activity and adaptation measures do not hamper adaptation efforts or the level of resilience to other people's physical climate risks, nature, cultural heritage, assets, and other economic activities or the objectives of Pakistan's NDC.** **2.2. Economic activity and adaptation measures are consistent with local, sectoral, regional, or national adaptation strategies and plans. If possible, nature-based solutions[28] (see criteria under the water sector WA4), which provide environmental, social and economic benefits and help build resilience, should be used.**

General Substantial Contribution Criteria for Economic Activities Enabling Adaptation	
Criteria	**Sub-criteria**
1. Contribution to adaptation of other economic activities Economic activity reduces material physical climate risk in other economic activities or addresses systemic barriers to adaptation. Activities that enable adaptation include activities that: • Promote existing technology, product, practice, governance process, or innovative use of existing technologies, products, or practices (including those related to natural infrastructure) • Remove barriers to information, finance, technology, impact awareness, education, and ability of others to adapt	**1.1. Economic activity facilitates adaptation to or reduces physical climate risks beyond the limits of the activity itself. The activity should demonstrate substantial contribution through enabling of adaptation in other activities through:** • A risk assessment — *Conduct a robust assessment of current and future climate risks, including the uncertainty associated with climate change.* — *Use reliable climate data and projections to identify the risks that the economic activity will help address.* — *Review other territorial risks that influence the activity.* • An assessment of the effectiveness of the contribution of economic activity to the reduction of these risks, considering the scale of exposure and vulnerability to them **1.2. If the activity involves infrastructure that allows for adaptation, ensure that it meets selection criteria of adapted activities.** The activity must ensure that infrastructure is resilient and can help other economic activities adapt to climate risks.

27 Understood as development of the resilience of a broader system, such as a community, population, ecosystem, city, territory, or other asset.

28 Nature-based solutions are actions to sustainably protect, manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing benefits for human well-being and biodiversity (IUCN 2016).

General Substantial Contribution Criteria for Economic Activities Enabling Adaptation	
Criteria	**Sub-criteria**
2. Cross-cutting criterion that applies to adapted economic activities that enable adaptation • Monitoring results of adaptation • Reduction of physical climate risks must be measurable.	Establish measurement indicators • Define clear and measurable indicators to assess reduction of physical climate risks and adaptation outcomes. • Ensure that these indicators are relevant and reflect the actual impact of the activity on adaptation. Continuous monitoring • Implement a continuous monitoring system to measure and evaluate results of adaptation over time. • Conduct climate risk assessments with appropriate frequency, considering evolving risks and new circumstances. Transparent communication • The activity transparently communicates the results of the adaptation achieved. • The activity provides clear information on how efforts are contributing to climate risk reduction and successful adaptation of other economic activities.

Sectors and Activities that Contribute Substantially to Multiple Environmental Objectives

The agriculture (including livestock), forestry, fishing and aquaculture sectors are of paramount importance to Pakistan due to their contributions to the nation's GDP and GHG emissions, accounting for 46.78% of total GHG emissions in 2021 [54] . These sectors are also directly impacted by the expected increase in the frequency of extreme weather events and alterations in precipitation and temperature patterns. Such changes are expected to affect the quality and volume of production, thereby posing potential risks to the country's food security. This section addresses the seven crosscutting environmental objectives for the agricultural (including livestock), forestry, and fishing sectors. It provides a list of sustainable practices that contribute to multiple environmental and climate objectives. These practices encompass climate change mitigation and adaptation, sustainable use and protection of water resources, protection of healthy ecosystems, and biodiversity. By implementing these practices, Pakistan can enhance the resilience and sustainability of these critical sectors, ensuring their continued contribution to economic growth and environmental stewardship.

For these sectors, green practices are classified into three levels of complexity (basic, intermediate, advanced), which ensures a gradual transformation process and transition of the farm.

- **Basic practices** are interventions that are relatively low cost and low complexity that enable more-efficient use of resources and contribute to environmental preservation with respect to the traditional extensive model.
- **Intermediate practices** are more complex than the basic, involving greater technical investment.
- **Advanced practices** fundamentally modify the production model, integrating techniques, knowledge, and inputs that improve production and environmental efficiency.

These sustainable management practices allow the land use sectors to transform by:

- Increasing carbon stocks and sinks on forest and agricultural lands.
- Climate risk management in agricultural production
- Minimising waste, optimising the use of resources and promotion of the regeneration of ecosystems.
- Preventing and reducing pollution and degradation of ecosystems by biotic and abiotic by-products used in agricultural practices.
- Improving the efficiency of use of water resources, as well as the protection and reduction of pollution of water sources.
- Reducing pressures on ecosystems and improving the habitat of agricultural/forestry production
- Protecting the physical, chemical and biological integrity of soils, preventing their degradation.

Annex 4 lists the references used to determine the criteria for substantial contributions for climate agriculture (including livestock), forestry, fishing and aquaculture.

Finally, this section includes sustainable practices for the tourism sector, which also cover different environmental objectives in a cross-cutting way.

Agriculture (Including Livestock), Forestry, Fishing and Aquaculture

Agriculture (including livestock), forestry, fishing and aquaculture (AFOLU) accounts for 25 percent of Pakistan's GDP, as a significant portion of the population relies directly or indirectly on this sector. The sector also employs approximately half of the country's employed labour force [52]. The sustainable practices for each of the sub-sectors established in the AFOLU sector are set out below.

Agriculture (Crops) and Livestock

In 2023, livestock accounted for 58 percent of the agricultural sector's GDP and 14 percent of national GDP [52]. Livestock serves as a catalyst for rural development, generating income and employment opportunities. However, livestock production systems are the primary source of methane emissions, due to enteric fermentation in digestive systems and manure management practices.

Crops accounted for 39 percent of the sector's GDP and 10 percent of national GDP in 2023 [52]. Managed soils, encompassing all soils used for forestry, cultivation, and pasture, are a source of direct and indirect GHG emissions, primarily nitrogen oxides. These emissions are naturally produced through various processes associated with the nitrogen cycle and through the addition of inorganic nitrogen to the soil. Direct nitrogen oxides emissions account for 61 percent of total emissions from managed soils in Pakistan, followed by indirect nitrogen oxides emissions (33 percent) and emissions from urea application (6 percent) [41].

Climate variability poses significant short-term harm to the sector and is likely to exacerbate in the long term. This sector is identified in various climate strategies of the country as one of the most crucial sectors in terms of emission reduction potential. It is also recognized as the sector where urgent action is required to combat the effects of climate change to ensure food security [55].

The following is a non-exhaustive list of the most important agricultural and livestock production regulations in Pakistan.

Table 3. Key Agricultural and Livestock Production Regulations on the Pakistan Market

- Khyber Pakhtunkhwa Agricultural and Livestock Produce Markets Act, 2007
- New Agri; Marketing Policy and Marketing Act, 2015
- Punjab Agricultural Marketing Regulatory Authority Act, 2018
- Legal Framework of Punjab Agriculture Department
- Agricultural Produce (Grading and Marketing) Act, 1937
- Corporate Agriculture Farming Policy
- Companies Act, 2017
- Pakistan Mercantile Exchange Agricultural Policies
- Electronic Warehouse Receipt Financing
- Pakistan Animal Science Council Bill, 2022
- Sindh Government Rules of Business, 1986
- Sindh Consumer Protection Act, 2015
- Godown Registration Act, 1996
- Weights and Measures Act
- Price Act, 2005
- Pakistan Cotton Cess Act

Activities in the agriculture (including livestock) sector have been mapped and grouped as follows:

Activity	ISIC/PSIC Code
A1. Perennial and non-perennial crops	ISIC/PSIC codes A011 and A012
A2. Animal production	ISIC/PSIC code A014

Technical criteria for these activities are as follows:

Sector	Agriculture
Activity	**A1. Perennial and non-perennial crops**
ISIC/PSIC	A011, A012
Description	Green, Amber and Ineligible practices dedicated to the production of perennial and non-perennial crops. The eligibility of green investments in this sector shall be based on the transition to climate-smart and regenerative agricultural practices,[29] which also affect ecosystem restoration and integrated management of the productive landscape to respond to the challenges of food security and low-carbon, climate change resilient production. Practices in production of perennial and non-perennial crops should focus on: • Protection and rational and efficient management of water resources • Conservation and rational use and recovery of soils • Conservation of forests, biodiversity, and other natural ecosystems • Restoration and ecological regeneration of degraded and degrading lands and agro-landscapes • Adaptation of production systems to climate variability and to the principles of sustainability, regenerative agriculture, environmental conservation, and reduction of emissions and pollution, considering profitability factors • Crop diversification, rotation, and association
Environmental Objective	Climate change mitigation, adaptation, and resilience; sustainable use and protection of water resources; protection of healthy ecosystems and biodiversity; pollution prevention and control; promotion of circular economy; sustainable land management
Methodology	Practice-based approach
Green	**Basic practices** (non-exhaustive list): **Crop rotation (in transitional or short-cycle crops):** Seeds, seedlings, equipment, local labour management, and technical assistance to facilitate crop rotation **Fertiliser management and efficient irrigation systems:** Equipment, tools, installations, and raw materials to produce biofertiliser; efficient irrigation systems such as responsive drip irrigation, with fertilisation systems integrated into the irrigation water (fertigation); equipment, tools, and materials for fertiliser application that allow timely, efficient, effective dosing (when the crop requires it, in the necessary quantity, with the specified quality), including replacement synthetic fertiliser prepared from organic material **Pest and disease control:** Supplies for biological and physical control of pests and diseases (e.g., repellent plant seeds, traps, or nets). If use of agrochemicals is required, only pesticides and fertiliser registered and permitted in the country must be used. Capacity building for application of pest- and disease-monitoring techniques and research, development, and dissemination of mechanical and biological control methods to keep pest populations under control are eligible. The pest and disease control may include Pre-Harvest Interval requirement, Farmers should keep a record of agrochemical inventory and ensure harvesting only after the recommended pre-harvest interval days.

29 Regenerative agriculture and climate-smart agriculture are farming approaches designed to increase environmental sustainability and resilience to climate change that differ in their focus and the specific practices they promote. Regenerative agriculture focuses on regenerating ecosystems, particularly soil, and promoting biodiversity, whereas climate-smart agriculture has a broader focus, with three main goals: increasing agricultural productivity and incomes, adapting to climate change, and reducing GHG emissions [34]. The taxonomy should facilitate both approaches because they complement each other, with regenerative agriculture focusing on ecosystem restoration and climate-smart agriculture focusing on climate resilience and adaptation strategies.

Sector	Agriculture
Activity	**A1. Perennial and non-perennial crops**
Green	Integrated Pest Management Plan (IPM) to prioritize biological control agents such as beneficial insects, microbial pesticides, and natural predators over chemical pesticides **Soil conservation:** Seeds, biofertiliser, compost, and light equipment for soil protection; equipment, materials, tools, and local labour for establishment and management of soil conservation practices; terrace construction on sloping soils or use of deep-rooting mulch (living mulch); capacity building for application of techniques and establishment of soil conservation and erosion control; and minimum soil disturbance. Practices related to low tillage of the soil or no-till farming to maintenance biomass coverage of the soil in at least 80 percent of the property. **Water management:** Technologies for improvement of irrigation, storage, drainage systems, and water remediation and treatment systems; installation of efficient water management systems (rainwater harvesting systems, water rationing and recycling); and establishment of individual and community-based pumping systems associated with small-scale irrigation systems with solar energy powered with water-saving technology such as drip irrigation. High-efficiency irrigation systems are eligible. **Shift from transient crops or pasture to agroforestry systems:** Seeds, seedlings, material for nursery development, and other inputs (equipment and local labor) to shift land use toward systems with greater carbon sequestration and better soil protection **Intermediate practices** (non-exhaustive list) **Waste management and treatment of water contaminated with organic waste:** Equipment, tools, inputs, and local labour for establishment and operation of systems for treatment and final disposal of agricultural waste and wastewater; collection, treatment, and disposal of empty pesticide containers; installation of agricultural wastewater monitoring and treatment systems to remove physical, chemical and biological contaminants before final disposal **Alternative crop residue management practices** to mitigate environmental and economic impacts of open burning of agricultural residues (e.g., conversion of crop residues into fertiliser, biochar products and biomass pelletizers made from rice husks, wheat, cotton, and other agricultural waste). Farmers can use equipment like happy seeders, supper seeder/combine seeders for better crop residue management and to save input cost. **Organic or green manure (mulch):** Equipment, material, tools, and inputs (e.g., compost bins, seedlings, local labour, vermicompost, biozote production from composting of organic waste for use as fertiliser). Resulting organic fertiliser must comply with the National Bio-Safety Guidelines, the Organic fertiliser Standards issued by the Pakistan Standards and Quality Control Authority, and applicable provincial fertiliser acts (e.g., Punjab fertiliser Act, Sindh fertiliser Ordinance). Leguminous crops used for green manure improve soil fertility by fixing atmospheric nitrogen, enhancing organic matter, and improving soil structure. Examples include: Sesbania, Sunn hemp, Soyabean, Berseem. **Advanced practices** (non-exhaustive list) **Use of sustainable production certifications or labels:** Certified agricultural productions: Sustainable Rice Platform (for growing rice with sustainable certification), Better Cotton Initiative, Global Organic Textile, World Wildlife Fund (for growing cotton with certification), Palm Oil Innovation Group, Rainforest Alliance, Global Good Agricultural Practices, Climate Friendly Rice Certification, Smartcane Best Management Practice programme, Roundtable on Sustainable Biomaterials Standard, Sustainable Rice Platform, International Federation of Organic Agriculture Movements certification, GLOBAL G.A.P. Number GNN certified farming, Proterra Foundation, Bonsucro (sugar)

Sector	Agriculture
Activity	**A1. Perennial and non-perennial crops**
Green	**Alternate wetting and drying techniques for saving water in rice production:** Equipment, tools and materials for implementation of alternate wetting and drying planting systems. The techniques must increase water efficiency by at least 30 percent over traditional permanent water ponding flooded without affecting crop yield. Direct seeding of rice is also an effective water-saving method, reducing water usage by up to 30 percent provided that weed control is managed efficiently. **Introduction of polycultures or intercropping of permanent crops:** Seeds, seedlings, materials, inputs, tools and equipment, local labour, and technical assistance to incorporate the polyculture system or crops associated with compatible species (preferably native timber or fruit trees) **Biotechnology in agricultural production chains:** Reproductive material, including in vitro plants, inputs, equipment, tools, local labour, and technical assistance to improve seeds and newly developed germplasm to increase yields and resilience to climate variability (these already exist for rice, maize, beans, and cassava); research, development, and dissemination of climate-resilient seeds and crops, including solutions such as CRISPR-Cas9[30]; and capacity building, technical assistance, equipment, facilities, tools, materials, inputs, and local labour for processing residual agricultural biomass in production of bioinputs for different uses. (Review and consider Biosafety Guidelines of the government of Pakistan) **Adoption and maintenance of monitoring and tracking technology:** adoption of monitoring and tracking technology to detect or locate areas of crop burning, increasing predictability and precision in agricultural operations. **Agricultural equipment powered by renewable energy:** Improvement in solar energy use in irrigation to combat drought; solar pumping systems based on renewable energy such as solar or wind, not hybrid with diesel, and used only for shallow aquifers; installation of renewable energy systems and procurement of biogas- and electricity-based agricultural machinery such as biodigesters and renewable energy equipment; includes installation and technical and managerial advice. Proper management of a solar tubewell that involves precise water control, including monitoring water levels and calculating the optimal pumping duration to meet specific irrigation needs; automated systems to help adjust operational times based on water demand, ensuring efficient energy use and minimising water wastage. Additional eligible green practices • Upgrade of Indus Basin Irrigation System rehabilitation programmes to modernize surface water distribution systems • Rural advisory services for project beneficiaries • Investments in income diversification to reduce sensitivity of rural communities as a complement to agricultural livelihoods • Affordable insurance products to increase climate resilience of agricultural • Construction and maintenance of flood and coastal erosion management measures for existing agricultural facilities • Weather monitoring and forecasting systems (e.g., early warning systems, including wildfire control measures to reduce damage from wildfires induced by heatwaves) • Policy and technological research and professional services to increase resilience in the agricultural sector. • Control of locust attacks by implementation early warning and monitoring measures, for instance alerts from Pakistan's National Locust Control Center (NLCC); use of natural predators and barriers and community-based prevention measures.

30 Genome-editing technology that allows DNA modifications of organisms with high precision, efficiency, and flexibility, that can be used for agriculture and crop improvement [78]

Sector	Agriculture
Activity	**A1. Perennial and non-perennial crops**
Green	Note: It may be beneficial to use the data portal and studies developed to identify the agro-ecological zones of Pakistan, which provide information on crops that should be grown based on climate and water availability. Agro-ecological zones of Pakistan | GAEZ v4 Data Portal.
Amber (Transition)	Eligible transition practices Until 2030, nutrient management plans based solely on chemical fertiliser for soil-based cultivation are eligible if there is a plan to shift to an integrated approach wherein nitrogen oxides emissions from nitrogen in the consumption of synthetic nitrogen fertiliser is reduced. Until 2030, phytosanitary management plans based solely on chemicals are eligible if there is a plan to shift to an integrated approach wherein biological and physical control of pests and diseases are prioritized. Awareness raising related to open burning of crop residue: Training and technical assistance programmes related to impacts of open burning and promotion of long-term cultivation
Red (Ineligible)	The following activities that would not be eligible under the Taxonomy: • Use of chemicals listed in the Updated National Implementation Plan for Phasing Out and Elimination of Persistent Organic Pollutants from Pakistan Under Stockholm Convention Article 7 (A) • Operations on land that has been defined as being of high conservation value, primary forest, or a protected or high-carbon stock area • Activities that indicate a change of land use (e.g., from forestry to livestock or agricultural land, from livestock to agricultural land) • Land that is not intended for agriculture and is best used for another activity • Activities involving deliberate open burning of crop residues, which is a major contributing factor to local and transboundary haze and air pollution.
DNSH Requirements	• All investments related to agricultural projects must comply with the country's regulations regarding land use and environmental protection. Important points to monitor include (applies to producers of all sizes): — *Location of the activity in relation to protected natural areas* — *Compliance of the activity with regulations related to protected areas or zones of ecological importance and environmental permits necessary for execution of the activity* — *Congruence of productive activities with applicable Urban Planning strategies at the national, provincial, and local levels* — *Verify and demonstrate compliance with applicable regulations. See Table 3.* • Environmental management plan In addition to complying with applicable regulations, developers of projects that may require green or transition investment will be able to demonstrate, through an environmental management plan, possible environmental impacts of the activity and preventive measures that can be taken to avoid significantly damaging natural resources, as well as highlighting the measures to enhance environmental benefits for the property where the activity to be financed will conducted. This plan will depend on the scale of the project and will apply mainly to medium and large producers. The implementation of these practices should be frequently monitored. Annex 6 presents a voluntary scheme for the design of this type of environmental management plan, as well as some measures for prevention of damage and environmental benefit that can serve as a guide for preparation of these plans (applies to medium and large producers).

Sector	Agriculture
Activity	**A2. Animal production**
ISIC/PSIC	A014
Description	Green, Amber and Ineligible operations dedicated to animal production. The eligibility of green investments in this sector shall be based on the transition to climate-smart agriculture, with good management of water and soil and local biodiversity synergistically managed. The practices proposed under this activity should have a positive impact on: • Protection and management of water resources • Soil conservation and recovery • Local biological diversity to produce high-quality livestock feed • Conservation of forests and other natural ecosystems • Ecological restoration of degraded lands and agro landscapes The main animals produced in Pakistan are buffalo, cattle, sheep, and goat [66]
Environmental Objective	Climate change mitigation, climate change, adaptation, and resilience, sustainable use and protection of water resources, protection of healthy ecosystems and biodiversity, pollution prevention and control
Methodology	Practice-based approach
Green	**Basic practices** (non-exhaustive list): **Paddock division and rotation:** Electric fences, fence posts (preferably live wood or recycled material) not derived from natural forests to separate grazing areas in a defined pattern adapted to the size of the farm to maintain the regenerative capacity of the pastures **Efficient management and protection of water sources:** Drinking troughs, hoses, floats, buoys, pumps, storage tanks, and piping to collect, store, and conserve water to provide livestock with clean, reliable water during seasonal and climatic variations. Harvest water and build livestock aqueducts. Projects related to protection of natural water sources, preventing direct access by livestock (e.g., by isolating riparian forest areas, planting native species for stream restoration) **Crop residue use** in livestock feeding projects **Physical protection of soil and increase in aboveground and groundwater biomass:** Livestock agroforestry technologies through installation of windbreaks, protection belts, living fences, or single- or multi-layer hedges with multipurpose forest or fruit species; rows with local trees **Capacity building on sustainable livestock models:** Reinforcement of capacity-building programmes on sustainable livestock models; promotion of technological development agreements with private sector and human capital formation **Intermediate practices** (non-exhaustive list): **Livestock health improvement:** Medical programmes, medicine and veterinary services, pasture-based protein banks or forage trees, harmless treatment systems for sick and dead livestock and poultry, construction of elevated beds **Reducing methanogens and improving animal diet:** Carbohydrates, dietary supplements, immunization materials, and technical expertise to reduce methanogens and other microbes involved in methanogenesis (e.g., incorporating 3-nitrooxypropanol into the animal diet to reduce emission of methane) **Pasture and fodder management:** Purchase and sowing of seeds of improved or natural varieties of grasses and native creeping legumes, selected according to soil and climatic conditions in the region; network of nurseries (including on-site nurseries) of native or focal tree material; equipment for planting trees and shrubs that provide fruits and leaves for livestock, accelerating soil recovery and favouring the wildlife population **Diversification of productive activities:** Livestock agroforestry technologies such as grazing in perennial crop plantations or forest plantations; family gardens with backyard livestock

Sector	Agriculture
Activity	**A2. Animal production**
Green	**Advanced practices** (non-exhaustive list): **Intensive silvopastoral systems:** Purchase and stocking of species tested under various regions and conditions; adaptation of paddocks, shade, drinking fountains, and related inputs; fodder banks, mixed fodder banks, and fodder hedgerows, allowing for greater variety of species, high protein benefits, nutrient recycling, soil moisture retention, and biodiversity **Organic and green manure, manure and effluent use:** good management of manure, urine, and other organic residue using equipment, materials, tools, and inputs (e.g., compost, seedlings, seeds, local labour, vermicompost); biochar production and biodigesters for organic waste management; construction of facilities for storage, treatment, and use of livestock and poultry waste **Improved breeds:** Research, development, and dissemination of livestock breeds to increase productivity and resilience and reduce GHGs (resistant to heat and water stress), including conventional breeding and biotechnology; eligible inputs: local breeds, conventional breeding (crossbreeding) giving preference to local breeds, biotechnological tools (review and consider Biosafety Guidelines of the government of Pakistan) **Use of sustainable livestock production certifications or labels:** Certified livestock productions: Global Roundtable for Sustainable Beef, Sustainable Poultry Network, PoultryCARE Monitoring and treatment services to prevent, monitor, and treat climate-related pathogens and diseases in ruminant livestock, poultry, and swine Construction of physical structures and installation of equipment to protect livestock against heat stress
Amber (Transition)	• Until 2030, nutrient management plans (grazing crops) based solely on chemical fertiliser for soil-based cultivation are eligible if there is a plan to shift to an integrated approach wherein nitrogen oxides emissions from nitrogen in consumption of synthetic nitrogen fertiliser is reduced. • Until 2030, phytosanitary management plans (grazing crops) based solely on chemicals are eligible if there is a plan to shift to an integrated approach that prioritises biological and physical control of pests and diseases.
Red (Ineligible)	• Use of feed related to ineligible operations under perennial and non-perennial crop activity. • Operations on continuous wooded areas: Land of more than 1 hectare with trees more than 5 m high and a canopy cover of more than 30 percent or trees capable of reaching these thresholds in situ • Operations on wetlands: Land covered or saturated with water permanently or for a significant part of the year (e.g., mangroves, floodplains) • Activities that indicate change of land use (e.g., from forestry to livestock or agricultural land, livestock to agricultural land) • Land that is not intended for livestock farming and whose best use is for forestry (e.g., by slope)
DNSH Requirements	• All investments related to agricultural projects must comply with the country's regulations regarding land use and environmental protection. Important points to monitor include (applies to small, medium and large producers): — *Location of activity in relation to protected natural areas* — *Compliance of activity with regulations related to protected areas or zones of ecological importance and environmental permits necessary for execution of the economic activity* — *Congruence of productive activities with applicable urban planning strategies at the national, provincial, and local levels* — *Verify and demonstrate compliance with applicable regulations. See Table 3.* • Environmental management plan.

Sector	Agriculture
Activity	**A2. Animal production**
DNSH Requirements	Note: In addition to complying with the applicable regulations, developers of projects that may require green or transition investment will be able to demonstrate, through an environmental management plan, possible environmental impacts of the activity and preventive measures that can be taken to avoid significantly damaging natural resources and to highlight measures that enhance the environmental benefits on the property where the activity to be financed will conducted. This plan will depend on the scale of the project and will apply mainly to medium and large producers. Annex 6 presents a voluntary scheme for the design of this type of environmental management plan, and some measures for prevention of damage and environmental benefit to help guide preparation of these plans (applies to medium and large producers).

Forestry

The forestry sector has the potential to provide environmental services that are extremely important in the fight against climate change. It can also play an important role in the local economy through sustainable and regenerative systems. Forests not only sequester and mitigate GHG emissions but also protect biodiversity. Afforestation, reforestation, and forest management to maximize carbon sequestration are key strategies for climate change mitigation in line with a 1.5°C pathway.

Climate change mitigation in the forestry sector is also strongly linked to avoiding deforestation and land-use change. Reducing or preventing deforestation is the mitigation option with the largest, most immediate carbon stock impact [67].

Green criteria investments in this sector are based on management and conservation of natural forests and sustainable use of forest plantations for commercial purposes. In this context, the actions proposed in this sector should help:

- Protect and manage water resources
- Conserve and recover soil
- Conserve forests and other natural ecosystems
- Ecologically restore degraded lands and agricultural landscapes
- Increase biomass by fixing CO_2

The following is a non-exhaustive list of regulations associated with national forest restoration plans.

Table 4. Regulations Associated with National Forest Restoration Plans

- National Forest Policy, 2015
- National Climate Change Policy, 2012
- National Action Plan for Forest and Landscape Restoration in Pakistan
- National Forest Monitoring System in Accordance with the United Nations Framework Convention on Climate Change Guidelines

Activities in the forestry sector have been mapped and grouped as follows.

Activity	ISIC/PSIC Code
F1. Sustainable forest management	ISIC code: A0200/PSIC code: A0210
F2. Forestry plantation	ISIC code: A0200/PSIC code: A0210
F3. Conservation, restoration, and maintenance of natural, pristine forests	ISIC code: A0200/PSIC code: A0210

Technical criteria for the selected activities are as follows.

Sector	Forestry
Activity	**F.1 Sustainable forest management**
ISIC/PSIC	A0200, A0210
Description	Green, Amber, and Ineligible assets, projects and related to sustainable forest management, including practices to reduce deforestation and natural forest degradation, technological development, technical assistance, and basic infrastructure are included.
Environmental Objective	Climate change mitigation, climate change, adaptation, and resilience, sustainable use and protection of water resources, protection of healthy ecosystems and biodiversity, pollution prevention and control
Methodology	Practice-based approach
Green	**Basic practices** (non-exhaustive list): **Nurseries required for adoption of integrated farm management practices:** Infrastructure, services, and materials needed to operate nurseries, including water, energy, and organic fertiliser and biofertiliser for biocontrol; high-quality seeds and plants to guarantee sustainability of managed forests **Monitoring systems:** Adoption and maintenance of monitoring technology that enables tracking of forest extracts and forest conservation status; software, hardware, analysis services, and communication equipment **Conservation and maintenance of forests:** Control and risk reduction, reinforcements for rangers and forestry officials or similar schemes, support for the forestry community and regional forest protection **Forest management and control:** Support of community forestry and regional projects related to forest protection and management, implementation of plans to monitor physical and functional condition of forests at a scale that allows for local action, control systems to protect forest integrity **Support of national programmes designed to conserve existing forests and increase the area under forest cover:** Technical and financial support to national programmes established in the NDC (e.g., Billion Trees Afforestation Project, Ten Billion Tree Tsunami Programme, and others that demonstrate an increase in forest cover, improvement of interconnected areas, and presence of native species) **Cultivation and conservation of honeybees (apiculture):** cultivation and conservation of honeybees (apiculture) plays a vital role in forest management by enhancing pollination, which supports biodiversity and ecosystem stability. Sustainable forest management practices, such as preserving nectar-rich flora, provide ideal habitats for honeybee colonies, ensuring their survival and productivity. **Intermediate practices** (non-exhaustive list): **Ecosystem services:** Activities for technical support and diffusion that increase carbon stocks or reduce the impact of forestry activities through associated management and information systems and other technologies; support for formation and strengthening of community-based organizations that support integration and sustainable use of ecosystem goods and services **Land acquisition** and refinancing if sustainable forest management practices are being conducted or being implemented as certified by credible national programmes or international schemes **Forest management norms:** Improvement of the regulatory framework and forest governance to strengthen the environment. **Shelter belt technology:** Establishment of windbreaks with suitable tree species to protect forests and farmland from erosion and extreme weather

Sector	Forestry
Activity	**F.1 Sustainable forest management**
Green	**Advanced practices** (non-exhaustive list): **Equipment** Activities related to pre- and post-extraction, including primary processing that is powered using renewable energy or is among the most energy efficient in the country as certified by or based on local energy efficiency standards and rating systems **Restoration:** A process of supporting an ecosystem that has been damaged, degraded, or destroyed in engaging a path of recovery to a reference state that ensures its health, integrity, and sustainability. Reforestation and afforestation increase connectivity between and improve the conditions of various ecosystems through new plantations in places where there is no forest (afforestation) or by salvaging degraded forest ecosystems through forest plantation processes (reforestation). All practices for restoration of forests are eligible. Certification schemes that are eligible for sustainable forest management • Forest Stewardship Council. • Programme for the Endorsement of Forest Certification • Rainforest Alliance **Non-timber forest products and related services:** Activities related to structuring and implementation of bio-business, including business advisory and planning, construction of basic infrastructure and facilities, and marketing mechanisms **Green technologies for forestry:** Biodigesters, biofuels, solar and wind energy systems, other renewable energy systems that meet criteria established in the energy sector of the Taxonomy, water management and treatment plants, other systems and practices focused on increasing energy and water efficiency **Use of early warning systems or wildfire control measures** (to reduce damage from wildfires) **Use of regeneration material (**species and ecotypes) that is less sensitive to strong winds, timely management of seedling stands, and timely thinning (to reduce damage to forest stands from increased wind)
Amber (Transition)	• Land acquisition with the purpose of adopting sustainable forest management practices as defined and certified by credible national schemes • Extraction of timber products to be used as biomass or feedstock for heat generation and biofuels (phase out by 2030)
Red (Ineligible)	• Exploitation of timber and non-timber products from any species that would lead to or further its threatened conservation status • Operations on land that have been defined as high conservation value or primary forest or as a protected or high-carbon stock area • Activities that indicate change of land use or forest degradation • Use of fire for land clearing
DNSH Requirements	• All investments related to agricultural projects must comply with the country's National Forest Policy, Protected Areas Initiative, or Plant for Pakistan. Important points to monitor include (applies to small, medium and large producers): — *Location of the activity in relation to protected natural areas* — *Compliance of the activity with regulations related to protected areas or zones of ecological importance and environmental permits necessary for execution of the activity* — *Congruence of productive activities with applicable urban planning plans at the national, provincial, and local levels* — *Verify and demonstrate compliance with applicable regulations. See Table 4.*

Sector	Forestry
Activity	**F.1 Sustainable forest management**
DNSH Requirements	**Establish a Forest management plan:** A document that outlines the silvicultural systems and practices to be applied in a forest. The person or entity interested in conducting forestry activities prepares the plan and must submit it to the relevant authorities for approval. The objective of the plan is to ensure sustainability of the forest by specifying how harvesting will be conducted and how the forest will be regenerated after the harvest. This plan is designed to ensure sustainable forestry use and incorporate the environmental management principles required in the Taxonomy, allowing renewal and preservation of resources and enhancing environmental benefits. Annex 7 presents an outline for a forest management plan.

Sector	Forestry
Activity	**F2. Forestry plantation**
ISIC/PSIC	A0200, A0210
Description	Green, Amber and Ineligible assets, projects and activities related to forestry plantation; reforestation for commercial purposes
Environmental Objective	Climate change mitigation, climate change, adaptation, and resilience, sustainable use and protection of water resources, protection of healthy ecosystems and biodiversity, pollution prevention and control
Methodology	Practice-based approach
Green	**Basic practices** (non-exhaustive list): **Forest management and control:** Use of organic and biofertiliser (only relevant for restoration or replanting of natural forest) according to type of plantation and monitoring of soil fertility and nutritional status of trees based on local conditions; use of physical and biocontrol of pathogens, pests, and weeds; fertiliser application equipment and materials that allow timely dosing **Conservation and maintenance of forests:** Control and risk reduction, reinforcements of rangers and forestry officials or similar schemes, support for the forestry community, regional forest protection. **Monitoring systems for natural forests control:** Adoption and maintenance of monitoring technology that enables tracking of forest extracts and the forest's conservation status, software, hardware, analytical services, and communication equipment. **Forest management and control:** Support of community forestry and regional projects related to forest protection and management. **Promotion of tree plantation and conservation in urban areas:** Investment in studies, consultancies and capacity building for development of urban forestry plans, contributing to greening cities and spaces in urban areas and protecting roadsides. With effective planning and management, urban trees and forests will improve air quality, reduce urban heat island effect, and enhance biodiversity. Urban forests also contribute to mental well-being and mitigate climate change by sequestering carbon. **Intermediate practices** (non-exhaustive list): **Establishment of forest:** Planting, deliberate seeding, or natural regeneration of non-forested land that was under a different land use or not used (afforestation) **Nurseries required for adoption of integrated farm management practices:** Infrastructure, services, materials needed to operate nurseries, including water, energy, and biofertilisers for biocontrol, highlighting the importance of native, climate-resilient species to prevent monoculture risks and enhance biodiversity

Sector	Forestry
Activity	**F2. Forestry plantation**
Green	**Forest regulations:** Improving the regulatory framework and forest governance to strengthen the environment; developing studies, consultancies, and training in forestry plantation (afforestation and reforestation) **Windbreak, fire and frost barriers, and living fences for commercial plantations:** Investments that physically and biologically protect plantations using trees and shrubs that protect against wind, fire, frost, floods, and pests and creation of biological corridors in protection and conservation areas within commercial plantations **Soil conservation and water management for commercial plantations:** Construction and procurement of equipment that allows efficient water management; planting of trees, which allows penetration and conservation of water **Block plantation of hybrid species:** Establishment of plantations with fast-growing hybrids to ensure rapid biomass production while maintaining soil stability **Advanced practices** (non-exhaustive list): **Agroforestry integration:** Combining timber and fruit trees with seasonal crops to diversify farmer income and improve soil health **Equipment** Activities related to pre- and post-extraction, including primary processing that is powered using renewable energy or is among the most energy efficient in the country as certified by or based on local energy efficiency standards and rating systems **Restoration:** Activities related to reestablishing forest areas on previously forested land, including activities focused on naturally regenerating forest after an extreme event in line with the Intergovernmental Panel on Climate Change definition or after a wildfire is defined by national law or equivalent **Terrace farming:** Development of terraces in sloped areas to manage water runoff and prevent soil erosion **Rhodes grass for hay:** Introduction of drought-resistant Rhodes grass into plantation systems for economic and ecological benefits Certification schemes for sustainable forest management • Forest Stewardship Council • Programme for the Endorsement of Forest Certification • Rainforest Alliance • National certifications **Non-timber forest products and related services:** Activities related to structuring and implementing bio-businesses, including business advisory and planning, construction of basic infrastructure and facilities, and marketing mechanisms. **Green technologies for forestry:** Biodigesters, wind energy, biofuels, solar energy, photovoltaic systems, water management plants, and other systems and practices focused on increasing energy and water efficiency
Amber (Transition)	• Until 2030, nutrient management plans based solely on chemical fertilisers are eligible if there is a plan to shift to an integrated approach wherein nitrogen oxides emissions from nitrogen in the consumption of synthetic nitrogen fertilisers is reduced. • Until 2030, phytosanitary management plans based solely on chemicals are eligible if there is a plan to shift to an integrated approach wherein biological and physical control of pests and diseases is prioritised.

Sector	Forestry
Activity	**F2. Forestry plantation**
Red (Ineligible)	• Use of chemicals listed in the Updated National Implementation Plan for Phasing out and Elimination of Persistent Organic Pollutants from Pakistan Under Stockholm Convention Article 7 (A) • Operations on land that has been defined as of high conservation value or primary forest or as a protected or high-carbon-stock area • Exploitation of timber and non-timber products from any species that would lead to or further its threatened conservation status • Activities that indicate change of land use or forest degradation
DNSH Requirements	All investments related to agricultural projects must comply with regulations regarding land use and environmental protection. Important points to monitor include (applies to small, medium and large producers): • Location of the activity in relation to protected natural areas • Compliance of the activity with regulations related to protected areas or zones of ecological importance and environmental permits necessary for execution of the activity • Congruence of productive activities with applicable urban planning plans at the national, provincial, and local levels • Verify and demonstrate compliance with applicable regulations. See Table 4. **Forest management plan:** A document that outlines the silvicultural systems and practices to be applied in a forest. The person or entity interested in conducting forestry activities prepares the plan and submits it to the relevant authorities for approval. The objective of the plan is to ensure sustainability of the forest by specifying how harvesting will be conducted and how the forest will be regenerated after the harvest. The plan is designed to ensure sustainable forestry use and incorporate the environmental management principles required in the Taxonomy, allowing renewal and preservation of resources and enhancing environmental benefits. Annex 7 presents an outline for a forest management plan.

Sector	Forestry
Activity	**F3. Conservation, restoration, and maintenance of natural, pristine forests**
ISIC/PSIC	A0200, A0210
Description	Green, Amber and Ineligible assets, projects, and activities related to conservation, restoration, and maintenance of natural, pristine forests, including restoration of degraded forest soils
Environmental Objective	Climate change mitigation, climate change, adaptation, and resilience, sustainable use and protection of water resources, protection of healthy ecosystems and biodiversity, pollution prevention and control
Methodology	Practice-based approach
Green	**Basic practices** (non-exhaustive list): **Conservation and maintenance of forests:** Control and risk reduction, reinforcements to rangers and forestry officials or similar schemes, support for forestry community and regional forest protection, conservation projects for protection or remediation of degraded ecosystems, construction and maintenance of ecological function areas **Management of natural forests:** Use of organic and biofertilisers (relevant only for restoration or replanting of natural forest); use of physical and biocontrol of pathogens, pests, and weeds **Nurseries with integrated farm management practices:** Development of buildings, services, and materials required to operate nurseries, including energy and water use, and use of seeds and seedlings sourced from native species in sustainably managed areas

Sector	Forestry
Activity	**F3. Conservation, restoration, and maintenance of natural, pristine forests**
Green	**Adoption and maintenance of monitoring technology:** Adoption and maintenance of monitoring technology that enables tracking of forest extracts and its conservation status, software, hardware, analytical services, and communication equipment **Forest management and control:** Support community forestry and regional projects related to pristine forest protection and management **Support of national programmes aimed at conserving forests in protected areas:** Technical and financial support of national programmess established in the NDCs (e.g., Protected Areas Initiative and others that demonstrate conservation of pristine forests) **Intermediate practices** (non-exhaustive list): **Rehabilitation and restoration of forests:** Supporting an ecosystem that has been damaged, degraded, or destroyed by engaging a path of recovery to a reference state that ensures its health, integrity, and sustainability. Activities aligned with national policies, the Restoration Initiative or the Convention on Biological Diversity are also eligible. **Ecosystem services:** Facilitation and promotion of schemes for valuing biodiversity and ecosystem services such as Payments for Ecosystem Services, carbon sequestration, cultural values, (Reduced Emissions from Deforestation and Forest Degradation activities; services related to design and development of projects and for certification, verification, and validation of projects Support for the formation and strengthening of organisations and communities that support integration and use of sustainable assets and ecosystem services **Financial investments:** Land acquisition with the purpose of conservation, restoration, and maintenance of forests **Forest management norms:** Investments in improvement of regulatory frameworks and forest governance to strengthen the environment, developing studies, consultancies, and training. **Advanced practices** (non-exhaustive list): **Reforestation:** Activities related to establishing forest areas on previously forested land, include activities focused on naturally regenerating forests after an extreme event in line with the Intergovernmental Panel on Climate Change definition, or after a wildfire, as it is defined by national laws or regulations. Studies and consultancies in the process of reforestation of natural forests are eligible.
Amber (Transition)	N.A.
Red (Ineligible)	Activities that indicate change of land use and occurring in forest degradation.
DNSH Requirements	All investments related to agricultural projects must comply with regulations regarding land use and environmental protection. Important points to monitor include (applies to small, medium and large producers): • Location of the activity in relation to protected natural areas • Compliance of the activity with regulations related to protected areas or zones of ecological importance and environmental permits necessary for execution of the activity • Congruence of productive activities with applicable urban planning plans at the national, provincial, and local levels • Verify and demonstrate compliance with applicable regulations. See Table 4.

Sector	Forestry
Activity	**F3. Conservation, restoration, and maintenance of natural, pristine forests**
DNSH Requirements	**Forest management plan:** This document outlines the silvicultural systems and practices to be applied in a forest. The person or entity interested in conducting forestry activities prepares the plan and submits it to the relevant authorities for approval. The objective of the plan is to ensure sustainability of the forest by specifying how harvesting will be conducted and how the forest will be regenerated after the harvest. The plan is designed to ensure sustainable forestry use and incorporate environmental management principles required in the Taxonomy, allowing renewal and preservation of resources and enhancing environmental benefits. Annex 7 presents an outline for a forest management plan.

Fishing and Aquaculture

Fishing and aquaculture present environmental challenges that must be addressed through sustainable management of marine fisheries and expansion of low-carbon aquaculture. Globally, this activity is key for achieving the goals of the Paris Agreement, with 21 percent of the reduction in GHG emissions that must take place in blue economy sectors required in 2050[31] [68].

Pakistan's valuable marine stocks are being overfished, considerable economic potential is being lost, and the livelihoods of poor coastal communities are threatened. In the capture fisheries sector, there are major challenges. First, there has been unrestricted entry and an increase in vessels, especially larger vessels (longer than 65 feet). The resulting increase in fishing activity and overfishing has led to declining catch yields and fish stocks. Overall, the major fish stocks are all below target biomass levels, with nine of the species groups falling below the depletion threshold. Second, value addition is unoptimised because institutional responsibility is fragmented and investment in the post-harvest value chain is inadequate. Third, artisanal fisheries are a vital source of livelihoods and food security for marginal coastal communities, but much value is lost because of poor practices. The socioeconomic systems of these communities are under threat because overfishing is depleting fishing stocks [69].

Eligibility of investments in this sector must be based on the transition to climate-smart fisheries and aquaculture practices[32] that make a substantial contribution not only to reducing carbon emissions, but also addressing different environmental objectives that enable efficiency in use of natural resources to be increased, marine resources and their ecosystem services to be protected and restored, the resilience of ecosystems to be maintained, and biodiversity loss to be reduced. The practices described can contribute to the following environmental objectives.

- Climate change mitigation
- Climate change adaptation and resilience
- Sustainable use and protection of water resources
- Protection of healthy ecosystems and biodiversity
- Pollution prevention and control

Following is a non-exhaustive list of national plans and regulations associated with sustainable fishing or aquaculture:

31 Including expansion offshore renewable energy and decarbonization of maritime transport.

32 The practices described can address different stages of the fisheries and aquaculture value chain.

Table 5. National Plans and Regulations Associated with Sustainable Fishing or Aquaculture

- National Implementation Plan for Sustainable Fisheries and Aquaculture Sector in Pakistan, 2020-2030
- Sustainable Fisheries Entrepreneurship: A Citizen-Based Approach to Saving Pakistan's Unique Marine Environment
- Advancing Sustainable Aquaculture of Pakistan
- National Policy and Strategy for Fisheries and Aquaculture Development in Pakistan
- Fisheries Development Policy and Strategy, 2022
- Indus Basin Development Fund Agreement
- Sindh Fisheries (Amendment) Act, 2011
- Sindh Fisheries Ordinance, 1980 (Amendment, 2005)

The activities in the aquaculture and fishing sector have been mapped and grouped as follows:

Activity	ISIC/PSIC Code
FA1. Sustainable aquaculture production	A031
FA2. Sustainable fishing production	A032

Technical criteria for the selected activities are as follows:

Sector	Fishing and Aquaculture
Activity	**FA1. Sustainable aquaculture production**
ISIC/PSIC	A031
Description	Green, Amber and Ineligible assets, projects, and activities related to sustainable aquaculture production, including practices for energy transition in production of aquaculture products and nature-based tools for sustainable aquaculture production
Environmental Objective	Climate change mitigation, climate change, adaptation, and resilience, sustainable use and protection of water resources, protection of healthy ecosystems and biodiversity, pollution prevention and control
Methodology	Practice-based approach
Green	**Basic practices** (non-exhaustive list): **Development of national sustainable aquaculture policies and plans:** Projects related to improving the strategic or coherent approach and accountability for management of aquaculture activity, including appropriate policies and regulations planned and enforced by a lead agency with the capacity and capability to plan sustainable aquaculture **Intermediate practices** (non-exhaustive list): **Water quality monitoring and evaluation:** Restorative aquaculture projects to improve water quality and invest in new restoration techniques (e.g., artificial habitat restoration structures using biodegradable potato starch and coral reef restoration) Investments in information systems, technology, and instruments deployed for measuring, tracking, and reporting physical and chemical indicators of the water body to achieve sustainable aquaculture management (review and consider the Environmental Quality Standards for wastewater treatment systems in Pakistan) **Water management:** Technologies that reduce water footprint and increase water conservation **Feed improvement:** Research and development of alternative (not wild-caught) feeds for aquaculture **Waste management:** Technological tools for treatment of aquaculture waste (e.g., biodigesters and treatment plants)

Sector	Fishing and Aquaculture
Activity	**FA1. Sustainable aquaculture production**
Green	**Seed improvement:** Scientific research or investments for animal seeds improvements to increase resilience **Pest and disease control:** Scientific research or implementation of measures to reduce pests and diseases in aquaculture production **Seaweed farming:** Practices that mitigate the effects of strong tides, mitigate destructive effects, capture harmful metals, or help with bioremediation **Integrated multi-trophic aquaculture (IMTA):** Systems in which different species from different trophic levels are farmed together, with the waste produced by one species providing nutrients for another, enhancing efficiency **Advanced practices** (non-exhaustive list): **Wastewater treatment:** Collection and treatment of effluents for removal of contaminants such as nitrogen, phosphorous, oil, grease, and solids discarded as part of cultivation and processing; technological tools for wastewater management for aquaculture, including construction and operation of facilities treating aquaculture wastewater **Recirculation systems:** Projects related to recirculation systems that allow reuse of water in aquaculture and thus reduce discharge of wastewater into the environment **Use of sustainable aquaculture production certifications or labels:** Certified aquaculture productions: Aquaculture Stewardship Council certification standard, Friend of the Sea, best aquaculture practices, Global Good Agricultural Practices. **Spatial planning for new aquaculture developments:** Identification of new production areas, ensuring that aquaculture takes place in appropriate areas and minimises conflict with other resource users through zoning and site selection **Nature-based tools for sustainable aquaculture production** demonstrate greater efficiency or ecosystem resilience (e.g., aquatic plant-based wastewater treatment systems and sustainable algae farming) **Marine ecosystem restoration:** Investments in equipment such as drones, autonomous underwater vehicles, and ocean buoys for measuring and reporting indicators about water body quality, thereby achieving sustainable aquaculture management Mangrove planting, restoration, and conservation to protect coastal areas from flooding Additional sectoral emissions come from product transport, and emission reductions are possible [70]. See the transport sector taxonomy for more information on fuel efficiency in transport.
Amber (Transition)	N.A.
Red (Ineligible)	N.A.
DNSH Requirements	• All investments related to agricultural projects must comply with regulations regarding aquaculture (if applicable) and environmental protection. Important points to monitor (applies to small, medium and large producers) — *Location of activity in relation to key ecological areas* — *Compliance of the activity with regulations related to protected areas or zones of ecological importance and environmental permits necessary for execution of the economic activity* — *Congruence of productive activities with applicable urban planning plans at the national, provincial, and local levels* — *Verify and demonstrate compliance with applicable regulations. See Table 5.* • Environmental management plan

Sector	Fishing and Aquaculture
Activity	**FA1. Sustainable aquaculture production**
DNSH Requirements	Note: In addition to complying with the applicable regulations, developers of projects that may require green or transition investment will be able to demonstrate, through an environmental management plan, possible environmental impacts of the activity and preventive measures that can be taken to avoid significantly damaging natural resources and to highlight measures that enhance the environmental benefits on the property where the activity to be financed will conducted. This plan will depend on the scale of the project and will apply mainly to medium and large producers. Annex 6 presents a voluntary scheme for the design of this type of environmental management plan, and some measures for prevention of damage and environmental benefit to help guide preparation of these plans (applies to medium and large producers).

Sector	Fishing and Aquaculture
Activity	**FA2. Sustainable fishing production**
ISIC/PSIC	A032
Description	Green, Amber and Ineligible assets, projects, and activities related to sustainable fishing production, including practices for conservation of coastal and marine ecosystems in sustainable fishing production and energy transition in industrial processing of fishing
Environmental Objective	Climate change mitigation, climate change, adaptation, and resilience, sustainable use and protection of water resources; protection of healthy ecosystems and biodiversity, pollution prevention and control
Methodology	Practice-based approach
Green	**Basic practices** (non-exhaustive list): **Wastewater treatment:** Collection and treatment of effluents and contaminants in water such as nitrogen, phosphorous, oil, grease, and solids discarded as part of the treatment process; technological tools for wastewater management for fisheries **Selective fishing techniques and improved gear in artisanal fisheries:** As in artisanal activity, manual practices are predominantly used in multispecies tasks (more than one species fished simultaneously); more-selective fishing gear and extraction systems allow for greater efficiency in the capture of target species by reducing bycatch of non-target species (examples of fishing methods with less environmental impact: collecting, diving, squid jigging). **Energy efficiency in industrial processing:** Evaluation of energy consumption in cookers, evaporators, dryers, boilers, steam distribution lines, motors, and pumps enables companies to reduce energy consumption and GHG emissions. **Intermediate practices** (non-exhaustive list): **Cultivation of seaweed to mitigate destructive effects of waves:** Seaweed has a structure and flexibility that allows it to act as a natural barrier against waves. Growing seaweed in coastal areas is vulnerable to erosion and the destructive effects of waves can reduce wave action and protect the coastline, preserving marine habitat and coastal fishing infrastructure. **Cogeneration of energy and reuse of waste heat:** Because of the nature of the production processes of fishmeal and other fishery products, electrical energy and useful thermal energy can be obtained simultaneously. **Coastal ecosystem rehabilitation programmes:** Prevent habitat loss while enhancing economic activities such as fishing. These programmes improve breeding grounds for fish, increase carbon storage, and prevent soil erosion. (e.g., Mangrove Rehabilitation Programme, which focuses on restoring mangrove forests to achieve these environmental and economic benefits)

Sector	Fishing and Aquaculture
Activity	**FA2. Sustainable fishing production**
Green	**Advanced practices** (non-exhaustive list): **Sustainable fishing production certifications or labels:** Marine Stewardship Council certification standard, Fairtrade Fisheries Standard, Natural Capital Protocol 2016. **Renewable energy:** Implementation of technology for development of tidal renewable energy for processing plants **Environmentally friendly fishery projects** such as carbon sink fishery and clean water fishery, rice-fish systems, and comprehensive use of saline-alkaline water for fisheries **Technologies for sustainable fisheries production** increase the efficiency or resilience of the ecosystem (e.g., selective fishing techniques and better gear in artisanal fisheries, jigging systems, conversion of wooden fleets from artisanal fisheries to fiberglass fleets) **Technologies for conservation of marine ecosystems in sustainable fisheries production** that increase the efficiency or resilience of the ecosystem (e.g., electronic identification devices, real-time monitoring and tracking systems, early warning systems for early response to extreme weather events) **Sustainable fisheries management to prevent overfishing:** Establishment of scientifically determined catch limits and enforcement of no-take zones to practice fishing (e.g., wind energy project area), use of selective fishing gear to reduce bycatch, strengthening of monitoring and surveillance to ensure compliance **Marine ecosystem restoration:** Investments in instruments such as drones, autonomous underwater vehicles, and ocean buoys for measuring and reporting on indicators about water bodies, thereby achieving sustainable fishery management. **Mangrove planting, restoration, and conservation to enhance fisheries:** Investments in conservation and restoration of mangroves, especially in areas close to human populations that provide a higher return on investment with respect to fisheries enhancement or increase resilience of coastal areas Many sectoral emissions come from product transport, and emission reductions are possible [70]. Refer to the transport sector taxonomy for more information on fuel efficiency in transport.
Amber (Transition)	N.A.
Red (Ineligible)	• Destructive and illegal fishing practices (overfishing; deep-sea trawling; fish bombing; blast fishing, unreported, and unregulated Fishing [71] • Species on the International Union for Conservation of Nature Red List for Endangered, Threatened, or Protected Species or regulated under the Convention on International Trade in Endangered Species of Wild Fauna and Flora • Drift net fishing, deep sea bottom trawling, and fishing with the use of explosives or cyanide are not eligible.
DNSH Requirements	• All investments related to agricultural projects must comply with regarding fishing and environmental protection. Important points to monitor (applies to small, medium and large producers) include: — *Location of activity in relation to key ecological areas* — *Compliance with regulations related to protected areas or zones of ecological importance and environmental permits necessary for execution of the economic activity* — *Congruence of productive activities with applicable urban planning plans at the national, provincial, and local levels* — *Verify and demonstrate compliance with applicable regulations. See Table 5.* • Environmental management plan

Sector	Fishing and Aquaculture
Activity	**FA2. Sustainable fishing production**
DNSH Requirements	Note: In addition to complying with the applicable regulations, developers of projects that may require green or transition investment will be able to demonstrate, through an environmental management plan, possible environmental impacts of the activity and preventive measures that can be taken to avoid significantly damaging natural resources and to highlight measures that enhance the environmental benefits on the property where the activity to be financed will conducted. This plan will depend on the scale of the project and will apply mainly to medium and large producers. Annex 6 presents a voluntary scheme for the design of this type of environmental management plan, and some measures for prevention of damage and environmental benefit to help guide preparation of these plans (applies to medium and large producers).

Tourism

Sustainable practices in the tourism sector aim to achieve a balance between economic, sociocultural and environmental factors. Tourism practices should also include low-impact activities designed to take place in natural areas, with the potential to contribute to their conservation.

PEPA, which governs tourism impacts in the country and international benchmarks such as those from the Global Sustainable Tourism Council were considered for the identification of sustainable practices in the tourism sector.

Although definitions and guidelines can be broad, it is possible to verify whether measures implemented within the area offers alternatives to make a substantial contribution to the country's environmental and climate objectives.

The PGT includes sustainable practices for tourism that improve the environmental performance of the tourism sector. The following are examples of activities associated with the tourism sector in the Taxonomy. The impacts they have on natural resources and their relationship with other productive sectors of the Taxonomy are identified for each of these activities.

Tourism is suitable for any place with natural wealth if sustainable, low-impact activities are developed, promoting conservation and respect for local communities. Table 6 provides examples of sustainable practices in the tourism sector.

Annex 4 lists the references used to determine the criteria for substantial contributions in the tourism sector.

Box 3. National Strategies and Deforestation and Habitat Destruction Requirements in Tourism Projects

Before project development, it must be demonstrated that none of the tourism practices **lead to deforestation and habitat destruction**. Avoiding deforestation in tourism requires sustainable planning, responsible infrastructure development and conservation-focused policies. Tourism investments in Pakistan should be aligned with existing strategies and initiatives in the country such as:

- **National Conservation Strategy:** Emphasizes the interdependence between tourism and the environment, highlighting the need for sustainable tourism practices to protect natural resources.
- **Mountain Architecture Guidelines:** Promotes sustainable tourism in Pakistan's mountain regions.
- **Ecotourism Society Pakistan:** Promotes ecotourism in Pakistan's mountain regions to enhance local livelihoods while conserving the environment.

Sustainable Tourism Foundation Pakistan: Provides advice and expert opinions to policymakers and stakeholders on sustainable tourism development.

Table 6. Guide for Tourism Sector—Ecotourism Investments

Sustainable Practices	Description	Criteria
TO1. Investments Related to the Protected Area Initiative Program	The initiative is designed to increase conservation efforts to promote ecotourism. The main objective of the initiative is to facilitate promotion and development of key wildlife habitats across major national parks for conservation and ecotourism.	This includes investments associated with protection of areas in national parks such as Chitral and Gilgit-Baltistan. Practices contemplated in the forestry sector, especially in activity F3. Conservation, restoration and maintenance of natural and pristine forests must be followed.
TO2. Development Of Tourism Infrastructure (Including Buildings and Eco-Friendly Accommodations)	Environmental impacts associated with construction of buildings such as hotels, restaurants and other types of infrastructure for tourism (e.g., impact on ecosystems, pressure on water resources, increase in energy consumption, generation of GHG emissions)	For investment in construction or renovation of a building in the tourism sector to be considered green, the activity must meet criteria defined for the construction sector (also considering the individual measures that apply), including compliance with do no significant harm (see activities B1, B2, B3 and B4). Local materials, practices, and crafts must be used in buildings and designs where practicable and appropriate. Waste from construction is sorted and disposed of in an environmentally sound manner. Renewable energy and energy efficiency measures must be implemented wherever viable. Performance indicators for hotels and accommodation for the Global Sustainable Tourism Council could be also consulted here: GSTC-Industry-Criteria-for-Hotels-with-SDGs.pdf.
	Impacts related to obtaining raw materials such as timber for construction activities of tourist facilities	For green investments associated with timber construction, it must be ensured that raw materials are procured in compliance with practices contemplated by the forestry sector in the Taxonomy. (See activities F1 and F2.)

Sustainable Practices	Description	Criteria
TO3. Provision of Utility Services: Energy, Water, and Waste in the Tourism Sector	Pollution from generation and inadequate waste management in tourist facilities	Green investments associated with management of waste derived from tourism service activities must be aligned with the criteria of the waste sector (e.g., waste collection and transport, anaerobic digestion or composting of organic waste)
	Increase in energy demand and emissions associated with expansion of electric power services in tourism sector activities	For green investments associated with generation, transmission, and distribution of energy necessary for tourism sector activities, energy must come from renewable sources or comply with the emissions threshold established in the energy sector of 100 gCO_2/kWh (See energy sector activities that can be implemented in the tourism sector.)
	Increase in demand for drinking water and generation of wastewater related to installation of drinking water and wastewater treatment systems for tourism sector activities	For investments associated with the construction of drinking water or wastewater treatment systems within the tourism sector, thresholds established for activities under the objective of mitigation or adaptation to climate change (e.g., nature-based solutions, sustainable urban drainage system, storm sewers), must be met (See activities in the water sector for mitigation and adaptation objectives.)
TO4. Passenger Transport	GHG emissions and air pollution from activities related to transport of tourists	Green investments associated with purchase and operation of vehicles used to transport tourists and staff must meet criteria of transport sector activities (e.g., zero-emission direct vehicles, multimodal transport, micromobility).
TO5. Construction And Operation of Climate Information and Communications Technology Infrastructure for Tourists	Risk of loss and damage from extreme weather events in tourist sites	Investments associated with construction and operation of information and communications technology infrastructure for timely issuance of extreme weather forecasts for tourists through mobile phones and internet are directly eligible.
TO6. Retrofit of Coastal Tourism Properties to Increase Climate Resilience	Impact on coastal tourism infrastructure of extreme weather events	Investments associated with retrofit of coastal tourism properties in identified vulnerable areas (e.g., low-lying beaches, other disaster-prone areas) to increase climate resilience are directly eligible.

Sustainable Practices	Description	Criteria
TO7. Responsible Adventure Tourism – Sustainable Trekking	Environmental and social impacts such as habitat destruction and soil erosion from repeated foot traffic that compacts the soil, mostly in sensitive areas with slow vegetation recovery. Excessive tourism may affects local communities and customs, among others.	Investments associated with implementation of a combination of environmental and social measures to minimise impact while maximising benefits for local communities, such as (non-exhaustive list): • Promote limited-or controlled access areas to preserve fragile ecosystems. • Develop conservation funds from tourism fees to maintain trails and protect nature. • Implement a permit system to limit the number of trekkers per season. • Encourage of local handicrafts and food instead of imported goods. • Introduce "Pack-in, Pack-out" policies for trekkers and tour operators to ensure that tourists do not eave foreign material behind. • Establish waste disposal points trekking routes. • Mark trails to guide tourists to designated hiking paths to prevent soil erosion and habitat destruction. • Encourage investments that meet the Global Sustainable Tourism Council criteria for sustainable tourism (https://www.gstcouncil.org/).

References

[1] UNFCCC, 2025. [Online]. Available: https://unfccc.int/topics/adaptation-and-resilience/the-big-picture/introduction#:~:text=Adaptation%20refers%20to%20adjustments%20in,opportunities%20associated%20with%20climate%20change.

[2] EPA, "How Does Anaerobic Digestion Work?," 2024. [Online]. Available: https://www.epa.gov/agstar/how-does-anaerobic-digestion-work.

[3] CEPAL, "Metodología del marco lógico para la planificación, el seguimiento y la evaluación de proyectos y programas," 2015. [Online]. Available: https://repositorio.cepal.org/server/api/core/bitstreams/2d86ecfb-f922-49d3-a919-e4fd4d463bd7/content.

[4] better cotton, "Who we are?," 2024. [Online]. Available: https://bettercotton.org/who-we-are/.

[5] USGS, "Biochemical Oxygen Demand (BOD) and Water," 2018. [Online]. Available: https://www.usgs.gov/special-topics/water-science-school/science/biochemical-oxygen-demand-bod-and-water.

[6] International Energy Agency, "An introduction to biogas and biomethane," 2023. [Online]. Available: https://www.iea.org/reports/outlook-for-biogas-and-biomethane-prospects-for-organic-growth/an-introduction-to-biogas-and-biomethane.

[7] Microbial Endophytes, "Biocommercial aspects of microbial endophytes for sustainable agriculture," 2020.

[8] EIA, "Biofuels explained," 2024. [Online]. Available: https://www.eia.gov/energyexplained/biofuels/.

[9] FAO, "Manual de Biogás," 2011. [Online]. Available: https://www.fao.org/4/as400s/as400s.pdf.

[10] International Energy Agency, 2023. [Online]. Available: https://www.iea.org/reports/outlook-for-biogas-and-biomethane-prospects-for-organic-growth/an-introduction-to-biogas-and-biomethane.

[11] M. &. S. H. &. Q. A. &. A. S. Khan Marwat, "Biozote Performance on Wheat in On-Farm Trials: Farmers' Perceptions," 2017.

[12] IPCC, "Glosario," 2014. [Online]. Available: https://www.ipcc.ch/site/assets/uploads/2019/03/AR5_SYR_Glossary_es.pdf.

[13] EEA, "Carbon sink," [Online]. Available: https://www.eea.europa.eu/help/glossary/eea-glossary/carbon-sink.

[14] European Parliament, "Circular economy: definition, importance and benefits," 2023. [Online]. Available: https://www.europarl.europa.eu/topics/en/article/20151201STO05603/circular-economy-definition-importance-and-benefits.

[15] ONU, "Convención Marco de las Naciones Unidas sobre el Cambio Climático," 1992. [Online]. Available: https://www.acnur.org/fileadmin/Documentos/BDL/2009/6907.pdf.

[16] IPCC, "Glosario," 2013. [Online]. Available: https://www.ipcc.ch/site/assets/uploads/2018/08/WGI_AR5_glossary_ES.pdf.

[17] FAO, "Climate-Smart Agriculture," 2021. [Online]. Available: https://www.fao.org/climate-smart-agriculture/en/.

[18] FAO, "Manual del Compostaje del Agricultor," 2013. [Online]. Available: https://www.fao.org/4/i3388s/i3388s.pdf.

[19] Deloitte, "The importance of decarbonisation explained," 2021. [Online]. Available: https://www.deloitte.com/nl/en/issues/climate/what-is-decarbonisation.html.

[20] FAO, "Evaluación de los Recursos Forestales Mundiales," 2018. [Online]. Available: https://openknowledge.fao.org/server/api/core/bitstreams/5d9b2107-2b32-4026-baca-f6de4e843cf4/content.

[21] A. Viancelli and W. Michelon, "Unlocking the value of biomass: Exploring microbial strategies for biogas and volatile fatty acids generation," 2023. [Online]. Available: https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/digestate.

[22] DCCEEW, "Environmental Management Plan Guidelines," 2014. [Online]. Available: https://www.dcceew.gov.au/environment/epbc/publications/environmental-management-plan-guidelines#:~:text=Environmental%20management%20plans%20describe%20how,that%20they%20are%20environmentally%20acceptable.

[23] FAO, “Forest Management Planning,” 2023. [Online]. Available: https://www.fao.org/sustainable-forest-management/toolbox/modules/forest-management-planning/tools/en/?type=111.

[24] FAO, “Bosques y energía,” 2008. [Online]. Available: https://www.fao.org/4/i0139s/i0139s00.pdf.

[25] IPCC, “Calentamiento global de 1,5°C,” 2019. [Online]. Available: https://www.ipcc.ch/site/assets/uploads/sites/2/2019/09/IPCC-Special-Report-1.5-SPM_es.pdf.

[26] BCN, “Greenwashing o “lavado verde” en la legislación comparada,” 2021. [Online]. Available: https://obtienearchivo.bcn.cl/obtienearchivo?id=repositorio/10221/32475/2/BCN_greenwashing_derecho_comparado_2021.pdf.

[27] UNFCCC, “Nationally Determined Contributions (NDCs),” 2020. [Online]. Available: https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs.

[28] UN, “Net-zero commitments must be backed by credible action,” 2022. [Online]. Available: https://www.un.org/en/climatechange/net-zero-coalition.

[29] ND-GAIN, “Helping countries and cities counter the risks of a changing climate,” [Online]. Available: https://gain.nd.edu/.

[30] EEA, “Organic fertiliser,” 2002. [Online]. Available: https://www.eea.europa.eu/help/glossary/eea-glossary/organic-fertiliser.

[31] E. o. A. a. F. Systems, “Climate Change: Cropping System Changes and Adaptations,” 2024.

[32] DFGE, “Understanding Product Carbon Footprint – A short Dive into Standards & Verification, Tools and industry-driven Initiatives,” 2023. [Online]. Available: https://dfge.de/understanding-product-carbon-footprint/.

[33] UNESCO, “Ramsar site,” [Online]. Available: https://whc.unesco.org/en/glossary/344.

[34] ISSI, “Regenerative Farming in Pakistan: A Pathway to Sustainable Agriculture,” 2024.

[35] Khan, M; Zaidi,A , “Run-of-river hydropower potential of Kunhar River, Pakistan,” 2015.

[36] ONU, “Desarrollo Sostenible,” 1987. [Online]. Available: https://www.un.org/es/ga/president/65/issues/sustdev.shtml.

[37] susdrain, “Sustainable drainage,” [Online]. Available: https://www.susdrain.org/delivering-suds/using-suds/background/sustainable-drainage.html.

[38] Tilley et al., “Upflow Anaerobic Sludge Blanket Reactor (UASB),” excerpt from Tilley et al., Sustainable Sanitation and Water Management Toolbox, 2014. [Online]. Available: https://sswm.info/sites/default/files/ecomp_print/TILLEY%20et%20al%202014%20T-11%20Upflow%20Anaerobic%20Sludge%20Blanket%20Reactor%20UASB.pdf.

[39] EPA, “What are volatile organic compounds (VOCs)?,” 2023. [Online]. Available: https://www.epa.gov/indoor-air-quality-iaq/what-are-volatile-organic-compounds-vocs.

[40] CEPLAN, “Estudio prospectivo sobre el estrés hídrico y la inseguridad alimentaria en el Perú,” 2023. [Online]. Available: https://cdn.www.gob.pe/uploads/document/file/5511475/4909702-estudio-prospectivo-de-estres-hidrico-e-inseguridad-alimentaria-ceplan.pdf.

[41] World Bank, “Preliminary research for green taxonomy of Pakistan,” 2023.

[42] WMO, “State of the Global Climate 2022,” 2023.

[43] World Bank Group, “Country Climate and Development Report,” 2022.

[44] IQAIR, 2024. [Online]. Available: https://www.iqair.com/pakistan.

[45] Boston Consulting Group, “Accelerating Green and Climate Resilient financing in Pakistan,” 2023.

[46] ISSI, “PAKISTAN’S NATIONAL CLIMATE FINANCE STRATEGY: A NEW FRAMEWORK FOR CLIMATE RESILIENCE,” 2024. [Online]. Available: https://issi.org.pk/wp-content/uploads/2024/12/IB_Salik_Dec_26_2024.pdf.

[47] UNEP, “Common Framework of Sustainable Finance Taxonomies for Latin America and the Caribbean,” 2023.

[48] Climate Watch, 2022. [Online]. Available: https://www.climatewatchdata.org/countries/PAK?end_year=2020&start_year=1990.

[49] IEA, “Methane Tracker,” 2024. [Online]. Available: https://www.iea.org/data-and-statistics/data-tools/methane-tracker.

[50] IQAir, 2023. [Online]. Available: https://www.iqair.com/in-en/newsroom/waqr-2023-pr.

[51] NDC, “Nationally Determined Contribution,” 2021.

[52] Pakistan Bureau of Statistics, 2023.

[53] UNDP, “GHG Emissions in Pakistan´s refrigeration and air conditioning sector,” 2021.

[54] GCISC, “National Greenhouse Gas Inventory Information for Pakistan,” 2021. [Online].

[55] UNFCCC, Pakistan´s first biennial update report, 2022.

[56] ITDP, “Defining Micromobility,” 2020. [Online]. Available: https://itdp.org/multimedia/defining-micromobility/.

[57] IMO, “2023 IMO STRATEGY ON REDUCTION OF GHG EMISSIONS FROM SHIPS,” 2023.

[58] Frontiers, “Empirical analysis of R&D spending, transport infrastructure development and CO_2 emissions in China,” 2023.

[59] IEA, “https://www.iea.org/reports/world-energy-outlook-2021,” 2021.

[60] IEA, “Buildings,” 2023. [Online]. Available: https://www.iea.org/energy-system/buildings.

[61] C. a. C. A. Coalition, “Pakistan moves toward environmentally friendly and cost-effective brick kilns,” 2018. [Online]. Available: https://www.ccacoalition.org/news/pakistan-moves-toward-environmentally-friendly-and-cost-effective-brick-kilns?utm_source=chatgpt.com.

[62] UN Water, “Progress on wastewater treatment,” 2021.

[63] Ministry of Planning, Development and Reform, “Pakistan 2025”.

[64] World Bank Group, “CLIMATE RISK COUNTRY PROFILE - PAKISTAN,” 2021.

[65] Pakistan Council of Research in Water Resources, “Annual report 2023-2024,” 2024.

[66] FAO - Pakistan Country Programming Framework , “Prosperity through Sustainable Agriculture,” 2011.

[67] IPCC, “AR6 Report,” 2022.

[68] World Resources Institute, “Turning the Tide: Ocean-Based Solutions Could Close Emission Gap by 21%,” 2019.

[69] World Bank, “Getting the Best from Pakistan’s Marine and Coastal Resources: A Blue Economy Management Approach,” 2024.

[70] S. K. S. A. Amina Shahzadi, “Climate-Smart fisheries production in Pakistan: A policy brief and way forward for decision-makers,” 2020.

[71] Widjaja, Long, and Wirajuda, “ Illegal-Unreported-and-Unregulated-Fishing-and-Associated-Drivers,” 2020.

[72] ALIDE, “Taxonomía Unón Europea,” 2021. [Online]. Available: https://www.alide.org.pe/wp-content/uploads/2021/12/DOCUMENTO-TAXONOM%C3%8DA2.pdf.

[73] UNFCCC, “Pakistan´s first biennial update report,” 2022.

[74] NEECA, “Energy Conservation Building Code of Pakistan,” 2023.

[75] TechTarget, 2025. [Online]. Available: https://www.techtarget.com/searchdatacenter/definition/power-usage-effectiveness-PUE.

[76] EEB, “Upgraging the Europe´s air: how strong industrial emissions directive can save lives and money,” 2023.

[77] ENVIRONMENTAL PROTECTION AND MANAGEMENTACT, “CHAPTER 94A, SECTION 77,” 2001.

[78] E. a. Ghulam Muha-Ud-Din, “CRISPR/Cas9-based genome editing: A revolutionary approach for crop improvement and global food security,” 2024.

Annexes

Annex 1. Co-benefits of Mitigation and Adaptation in Pakistan

The table below presents examples of activities that have these linkages and generate co-benefits to other objectives prioritised by the Taxonomy.

Primary Environmental Objective	Secondary Environmental Objectives	Examples of Activities That May Have Environmental Co-Benefits
Climate Change Mitigation	**Climate Change Adaptation**	• Desalinating for water supply in water-stressed area
	Sustainable Use and Protection of Water Resources (Including Marine Water Resources)	• Building water supply and sewage and wastewater treatment systems to improve quality of water resources.
	Protection of Healthy Ecosystems and Biodiversity	• Using recycled materials or fibres for sustainable sources, reducing pressure on natural resources, minimising waste, promoting efficient use of materials, and thus reducing habitat degradation.
	Pollution Prevention and Control	• Activities in energy, transport and manufacturing, complying with emissions levels based on best available techniques and national – or provincial – environmental quality standards.
	Promotion of Circular Economy	• Using technologies that allow for optimal use and recycling of solid waste. Generating by-products such as soil amendments or biogas from organic waste valorisation.
	Sustainable Land Management	• Developing eco-tourism to drive preservation of valuable ecosystems through responsible management practices by creating economic incentives for protecting forests, wetlands, and other natural landscapes that act as carbon sinks.
Climate Change Adaptation	**Climate Change Mitigation**	• Desalinization plants using low-carbon energy • Producing renewable energy on-site and reducing grid dependence.
	Sustainable Use and Protection of Water Resources (Including Marine Water Resources)	• Protecting watersheds in high-risk areas. • Stormwater management. • Sustainable management of river basins and protection of aquifers for water-intensive industries. • Modernising adequate water pricing (A-biana framework)

Primary Environmental Objective	Secondary Environmental Objectives	Examples of Activities That May Have Environmental Co-Benefits
	Protection of Healthy Ecosystems and Biodiversity	• Reinforcing coastal protection. Building sea walls on low-lying islands to stop coastal erosion). • Protecting natural capital (wetlands, marine and coastal ecosystems, coastal or forest mangroves, among others)
	Pollution Prevention and Control	• Implementing flood prevention measures in waste management plants. Reducing the amount of plastic waste entering the marine environment. • Installing early warning systems for leakage detection systems.
	Promotion of Circular Economy	• Designing sustainable buildings and/or based on bioclimatic architecture, in climate-resilient areas, and with resilient water and energy management.
	Sustainable Land Management	• Conducting hydrological modelling and flood -plain mapping and zoning of the Indus River system • Restoring wetlands to improve water quality, protection of coastal zones, among others.

The land use sector covers all environmental objectives in a cross-cutting manner, through sustainable practices that have verifiable co-benefits that meet various environmental objectives. Development of eco-tourism in the Pakistan Green Taxonomy can provide environmental co-benefits through investments associated with preservation of valuable ecosystems, inclusion of renewable energy and energy efficiency, decreasing GHG emissions, and investments in a combination of environmental and social measures to minimise impact while maximising benefits for local communities.

Annex 2. Key Findings for Sectoral Prioritisation—Climate Change Mitigation and Adaptation for the Pakistan Green Taxonomy

Key Findings for Sectoral Prioritisation—Climate Change Mitigation

- **Energy and manufacturing** were the **key sectors** identified in the policies and regulations reviewed for **climate change mitigation**, followed by **transport, construction (buildings) and agriculture**. The Pakistan Clean Air Policy also identified these as priority sectors, in addition to **waste.**
- The Climate Change Policy 2021 acknowledges that achieving its targets requires focused efforts in the **transport, manufacturing, infrastructure, agriculture, and energy sectors**.
- **Water supply and management and waste prevention and reduction were also identified as priorities in key policies** such as the National Environmental Policy, the Pakistan Environmental Protection Act 1997 and the Water Policy 2018.
- Other provincial regulations highlighted **waste management, transport, forest management, water and energy security** as key areas of intervention to mitigate climate change. These policies also highlight the importance of developing plans to mitigate GHG emissions, in alignment with the latest NDCs and GHG inventories.
- **Energy, manufacturing, water, waste, transport and construction** sectors are covered in most existing taxonomies. For each sector, taxonomies provide a list of economic activities that could be considered sustainable. **Information and communication technologies (ICT)** is included as an enabling[33] sector in **all taxonomies. "professional, scientific, and technical activities"** are considered enabling sectors for the EU, association of Southeast Asian Nations and Indonesian Taxonomies. The EU Taxonomy also includes **"financial and insurance activities"** as an enabling sector. [72]
- **Agriculture (including livestock), forestry, fishing and aquaculture** sector was found to be the most **significant** in terms of GHG emissions and GDP.
- Although the **manufacturing sector** r accounts for only 5 percent of total greenhouse gas emissions from industrial processes, it plays a crucial role in the country's economic development. It is essential for job creation and is a key sector for advancing decarbonization efforts. [73]
- The **transport sector** accounts for about 11 percent of GHG emissions and has shown the highest growth rate among all sectors in the present and recent decades with the increase in projects aimed at improving infrastructure and mass transit programmes in major cities to reduce GHG emissions. [73]
- The **energy sector** is an integral part of the economy and has direct and indirect impact on other economic sectors, mainly in the evolution of the energy-mix. **Energy** (including **energy use in transport, construction and industry**) and agriculture, have the **highest transition potential for decarbonisation.**
- The **construction sector** (buildings) accounts for 14 percent of GHG emissions. According to the Building Energy code of Pakistan, buildings in the country consume more than 54% of the total electricity produced and comsuption has been growing for the past two decades, reaching a compound annual growth rate of 12.3 percent. [74]
- The **waste sector** accounts for 5 percent of GHG emissions and there was no specific quantitative data for the Water sector. However, for both sectors there is a need to shift towards better water supply and sanitation and waste management.

33 The enabling sectors such as ICT, professional services, among others help in the decarbonisation of other sectors and do not necessarily contribute to their own GHG mitigation

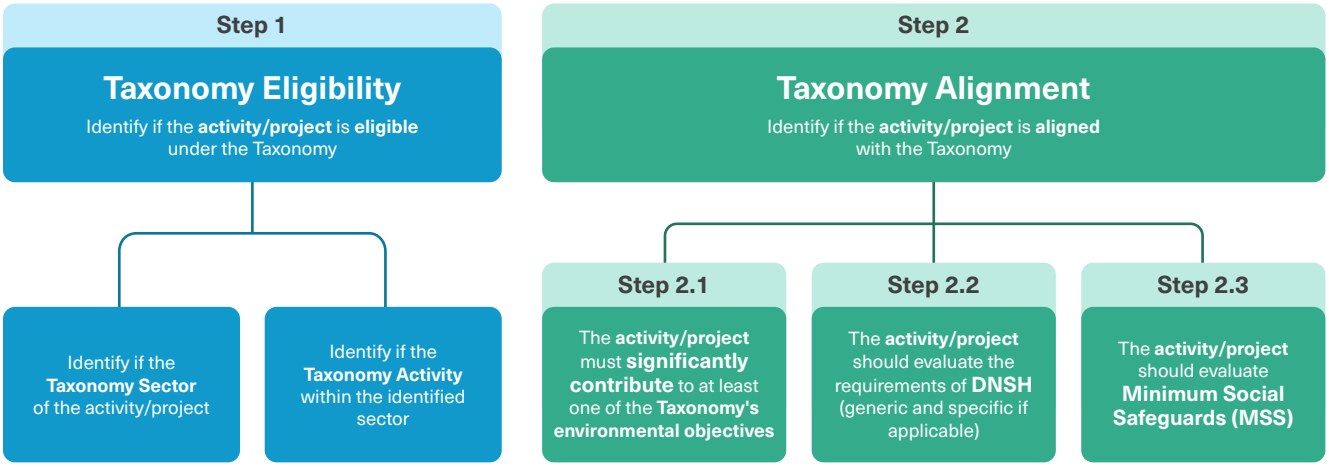
Key Findings for Sectoral Prioritisation—Climate Change Adaptation

- **Urban resilience and agriculture - water nexus** are key sectors in most of the policies and regulations reviewed for climate change adaptation in Pakistan; followed by **Natural Capital Ecosystem services and Disaster Risk management.**
- **Human capital** is also a key focus for building capacity for adaptation and resilience.
- Improvement of **watershed, drought and flood management** is mentioned as a key area in the Water Policy 2018.
- Other provincial regulations recognise importance of adaptation and highlight **agriculture and livestock, forestry, human health, water resources, biodiversity, transport, land and vulnerable ecosystems and disaster preparedness** as priority areas for climate change adaptation. The importance of conducting climate inclusive multi-hazard vulnerability and risk assessment at the district level is also highlighted.
- Sectors such as **water, agriculture, construction, transport and ICT** are covered under the adaptation objective in **most existing taxonomies**. The EU Taxonomy covers most sectors from an adaptation perspective. The screening criteria are similar for most activities and are based on a vulnerability assessment. [72]
- Sector prioritisation was also qualitatively assessed based on the Notre Dame-Global Adaptation Index and secondary information from the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Based on this index, the most vulnerable sectors to climate change in Pakistan are **food, water, health, ecosystem services, human habitat, infrastructure.**

Annex 3. Taxonomy Eligibility and Taxonomy Alignment

Figure 5 illustrates the concepts of eligibility and alignment under the Taxonomy. In synthesis, an activity or project is eligible when the **sector and activity** is **listed** in the Taxonomy. On the other hand, for an activity/project to be **aligned** with the Taxonomy, it must demonstrate compliance with all screening criteria.

Figure 5. Alignment with Pakistan Green Taxonomy



Step 1. Determine whether the activity or project is eligible under the Taxonomy: For an activity or project to be eligible, it must be listed in the Taxonomy.

Step 2. Determine whether the activity or project is aligned with the Taxonomy

Step 2.1. Determine whether the activity or project substantially contributes to at least one of the Taxonomy's environmental objectives by assessing the technical screening criteria for substantial contribution.

The substantial contribution criteria are usually quantifiable, although certain activities have qualitative criteria or are directly eligible because of their inherent contribution to achievement of the priority environmental objective. The substantial contribution criteria in the Taxonomy were customized to the needs and reality of Pakistan based on consultations with local sector leaders and experts.

Step 2.2: The activity or project should evaluate the DNSH requirement (generic and specific if applicable).

To prevent the activity or project to be financed from causing significant environmental harm during its execution. The general requirements are set out below, and the specific requirements can be found in each activity card.

Step 2.3: The activity or project should evaluate the MSS

The entity developing the activity or project should evaluate compliance with the MSS, which ensure that activities are in line with minimum social conventions (e.g., labour laws, land tenure rights, international human rights commitments). The substantial contribution and the DNSH criteria are applied at the activity level, and the minimum social safeguards criteria are applied at the entity level.

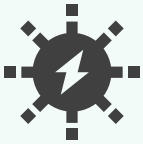
Annex 4. List of References to Determine the Criteria for Substantial Contribution

The following is a list of the references that were analysed to determine the criteria for substantial contribution in the **manufacturing** sector:

- Technical documents:
  - *Threshold recommended by the Engineering Development Board (cement production)*
  - *Handling, Manufacture, Storage, Import of Hazardous Waste and Hazardous Substances Rules, 2024 (regulatory framework)*
  - *Single-Use Plastics Regulations, 2023*
  - *Minimum Energy Performance Standards for Lighting and other National Energy Efficiency and Conservation Authority Standards*
  - *Textile and Apparel Policy of 2020-25*
  - *Climate and Clean Air Coalition (manufacturing of bricks reports for Pakistan)*
  - *Global Cement and Concrete Association*
  - *International Energy Agency (Industry decarbonization pathways)*
  - *Climate Bonds Initiative criteria for basic chemicals for use for certification in green bonds*
  - *Climate Bonds Initiative criteria for cement sector for use for certification in green bonds*
  - *Climate Bonds Initiative criteria for steel sector for use for certification in green bonds*
- Taxonomies:
  - *Sri Lanka Green Finance Taxonomy*
  - *EU Taxonomy*
  - *Singapore Green Taxonomy*
  - *Colombian Green Taxonomy*
  - *Rwanda Green Taxonomy*

The following is a list of the references that were analysed to determine the criteria for substantial contribution for **transport** sector:

- Technical documents:
  - *International Energy Agency - transport decarbonization pathways*
  - *National Electric Vehicle Policy 2019*
  - *Pakistan Clean Air Policy*
  - *Climate Bonds Initiative criteria for low carbon transport for use for certification in green bonds*
- Taxonomies:
  - *Sri Lanka Green Finance Taxonomy*
  - *EU Taxonomy*
  - *Singapore Green Taxonomy*
  - *Colombian Green Taxonomy*
  - *Rwanda Green Taxonomy*



The following is a list of the references that were analysed to determine the criteria for substantial contribution for **energy** sector:

- Technical documents:
  - *South Asia Group for Energy (SAGE) - Decarbonization Pathways for South Asia*
  - *International Energy Agency - decarbonisation pathways for energy sector*
  - *National Electricity Policy 2021*
  - *National Electricity Plan 2023-27*
  - *National Energy Efficiency & Conservation Policy 2023*
  - *National Action Plan Energy Efficiency & Conservation 2023-2030*
  - *Alternative and Renewable Energy (ARE) Policy 2019*
  - *Framework Guidelines for Fast Track Solar PV Initiatives 2022*
  - *NEPRA's State of Industry Report 2023*
  - *SECP Green Bond Guidelines*
  - *Climate Bonds Initiative Criteria for electrical Grids and Storage for use for certification in green bonds*
  - *Climate Bonds Initiative - Geothermal Criteria for use for certification in green bonds*
  - *Climate Bonds Initiative - Hydrogen Production Criteria for use for certification in green bonds*
  - *Climate Bonds Initiative - Hydropower Criteria for use for certification in green bonds*
  - *Climate Bonds Initiative - Marine Renewable Energy Criteria for use for certification in green bonds*
  - *Climate Bonds Initiative - Solar energy Criteria for use for certification in green bonds*
  - *Climate Bonds Initiative – Wind energy Criteria for use for certification in green bonds*
- Taxonomies:
  - *Bangladesh Taxonomy*
  - *Sri Lanka Green Finance Taxonomy*
  - *EU Taxonomy*
  - *Singapore Green Taxonomy*
  - *Colombian Green Taxonomy*
  - *Rwanda Green Taxonomy*

The following is a list of the references that were analysed to determine the criteria for substantial contribution for **construction** sector:

- Technical documents:
  - *Carbon Risk Real Estate Monitor (CRREM) - decarbonisation pathways, including Asia for the commercial and residential real estate sector.*
  - *Energy Conservation Building Code 2023*
  - *ICMA Green Building Guidelines*
- Taxonomies:
  - *Bangladesh Taxonomy*
  - *Sri Lanka Green Finance Taxonomy*
  - *EU Taxonomy*
  - *Singapore Green Taxonomy*
  - *Colombian Green Taxonomy*
  - *Rwanda Green Taxonomy*

The following is a list of the references that were analysed to determine the criteria for substantial contribution for **water and waste** sectors:

- Technical documents:
  - *Guidelines on SWM established by PEPA*
  - *The Waste Management Criteria of CBI*
  - *Water Infrastructure Criteria of CBI*
  - *Pakistan Engineering Council (PEC) standards for water supply and wastewater systems.*
  - *The National Sanitation Policy (2006), which outlines guidelines for wastewater collection, treatment, and disposal.*
  - *Pakistan Standard and Quality Control Authority (PSQCA) sets standards for the construction materials used in water and sewer systems.*
  - *Punjab Water Act 2019*
  - *Sindh Water Management Ordinance, 2002*
  - *Khyber Pakhtunkhwa Water Act (2014)*
  - *World Health Organization (WHO) guidelines and Pakistan Standards for Drinking Water Quality ensure safe water provision, covering aspects like turbidity, chemical contamination, and microbial safety*
- Taxonomies:
  - *Sri Lanka Green Finance Taxonomy*
  - *Singapore Green Taxonomy*
  - *Colombian Green Taxonomy*
  - *Rwanda Green Taxonomy*

The following is a list of the references that were analysed to determine the criteria for substantial contribution for **ICT** sector:

- Technical documents:
  - *Pakistan's digital policy*
  - *E-waste Management Standard Operating Procedures June 2024 (Sindh)*
  - *Development of Standard Operating Procedures for E-waste Management Final Report September 2023 (Punjab)*
  - *E-waste Management Plan Punjab Urban Land Systems Enhancement (PULSE) Project (P172945)*
  - *Pakistan Standards and Quality Control Authority (PSQCA).*
- Taxonomies:
  - *Sri Lanka Green Finance Taxonomy*
  - *Singapore Green Taxonomy*
  - *Colombian Green Taxonomy*
  - *Rwanda Green Taxonomy*

The following is a list of the references that were analysed to determine the criteria for substantial contribution for **tourism** sector:

- Technical documents:
  - *Global Sustainable Tourism Council (GSTC) criteria*
  - *National Conservation Strategy (NCS)*
  - *Mountain Architecture Guidelines*
  - *Ecotourism Society Pakistan (ESP)*
  - *Sustainable Tourism Foundation Pakistan (STFP)*
- Taxonomies:
  - *Costa Rica Taxonomy*

The following is a list of the references that were analysed to determine the criteria for substantial contribution for **agriculture (including livestock), forestry, and fishing** sector:

- Technical documents:
  - *Khyber Pakhtunkhwa Agricultural and Livestock Produce Markets Act, 2007*
  - *New Agri; Marketing Policy and Marketing Act, 2015*
  - *Punjab Agricultural Marketing Regulatory Authority Act, 2018*
  - *Legal Framework of Punjab Agriculture Department*
  - *Agricultural Produce (Grading and Marketing) Act, 1937*
  - *Corporate Agriculture Farming Policy*
  - *Companies Act, 2017*
  - *Pakistan Mercantile Exchange Agricultural Policies*
  - *Electronic Warehouse Receipt Financing*
  - *Pakistan Animal Science Council Bill, 2022*
  - *Sindh Government Rules of Business, 1986*
  - *Sindh Consumer Protection Act, 2015*
  - *Godown Registration Act, 1996*
  - *Weights and Measures Act*
  - *Price Act, 2005*
  - *Pakistan Cotton Cess Act*
  - *National Forest Policy, 2015*
  - *National Climate Change Policy, 2012*
  - *National Action Plan for Forest and Landscape Restoration in Pakistan*
  - *National Forest Monitoring System in Accordance with the United Nations Framework Convention on Climate Change Guidelines*
  - *National Implementation Plan for Sustainable Fisheries and Aquaculture Sector in Pakistan, 2020-2030*
  - *Sustainable Fisheries Entrepreneurship: A Citizen-Based Approach to Saving Pakistan's Unique Marine Environment*
  - *Advancing Sustainable Aquaculture of Pakistan*
  - *National Policy and Strategy for Fisheries and Aquaculture Development in Pakistan*
  - *Fisheries Development Policy and Strategy, 2022*
  - *Indus Basin Development Fund Agreement*
  - *Sindh Fisheries (Amendment) Act, 2011*
  - *Sindh Fisheries Ordinance, 1980 (Amendment, 2005)*
- Taxonomies:
  - *Panama Green Taxonomy*
  - *Costa Rica Taxonomy*
  - *Colombia Green Taxonomy*
  - *Rwanda Green Taxonomy*

The following is a list of other references that were analysed to determine the criteria for substantial contribution for **adaptation objective**:

- Technical documents:
  - *National Adaptation Plan*
  - *The national climate change policy framework*
  - *The national disaster risk management framework*
- Taxonomies:
  - *Panama Green Taxonomy*
  - *Costa Rica Taxonomy*
  - *CBI Resilience Taxonomy*
  - *Rwanda Green Taxonomy*

Annex 5. Market Baseline (Business as Usual) for Energy Consumption in Buildings for Pakistan

Pakistan does not have an official market baseline for energy consumption in buildings. Minimum requirements for energy-efficient design and operation of buildings are defined in the Energy Conservation Building Code (ECBC) 2023, which is designed to increase energy efficiency in the building sector by 15 to 20 percent.

ECBC 2023 is aligned with international standards such as the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) or the American National Standards Institute to reduce energy consumption and mitigate the impacts of climate change. It provides an implementation and enforcement plan covering energy-efficient and low-emission construction materials, passive building design, energy appliance monitoring devices, electric vehicle charging points, energy management systems, building insulation, and renewable and geothermal energy.

The purpose of this annex is to compare the minimum energy performance that a building that complies with ASHRAE 90.1 or ECBC 2023 requires.

Market Baseline

The lack of reliable information on the energy performance of buildings in Pakistan requires use of international standards or green building certifications to assess when an asset can be labelled “green” or eligible under sustainable finance criteria.

The International Capital Markets Association promotes development of the international capital and securities market, defining rules, principles, and recommendations for the financial industry world-wide, and supports development of sustainable finance by defining principles and guidelines in the bond and wider debt capital markets.

International Capital Markets Association guidelines for buildings propose a series of indicators to capture and illustrate the environmental and sustainability benefits of projects related to green buildings: energy performance, carbon performance, water efficiency and savings, waste management, and certification standards, if available.

Usual guidelines for green buildings are that they:

- Should be certified by an international or credible national standard
- Must be 20 percent more efficient than baseline
- Must be able to report savings in energy, water, and GHG emissions

Because there is no official baseline for Pakistan, energy efficiency must be calculated against the baseline that each standard or certification has defined or against the minimum performance required under ECBC 2023. One of the most used standards is ASHRAE 90.1, which sets minimum energy efficiency requirements for buildings. Climate zones influence the baseline characteristics for energy performance comparisons. Pakistan has multiple climate zones because of its diverse geography, and these zones dictate the baseline characteristics for building energy efficiency comparisons. Below is an overview of these characteristics.

Baseline Building Characteristics: ASHRAE 90.1

The baseline characteristics for a building in Pakistan depend on in which climate zone the building is located. Each climate zone has different assumptions for building envelope; heating, ventilation, air conditioning (HVAC); lighting and other systems in the baseline model. Below are the main characteristics for the baseline, based on general ASHRAE guidelines.

Building Envelope

Insulation and U-factor: the baseline building's wall, roof, and window insulation values (R-value) and heat transfer rate (U-value) are defined based on the climate zone. In hot, humid areas (Zone 1A), the building will have lower insulation values than in cold areas (Zone 5B). Glazing (window) U-values are also based on climate, with lower U-values (better insulation) required in cooler zones (e.g., Zone 5B).

Solar heat gain coefficient: This measures the amount of solar radiation admitted through windows, used especially in hot climates. Lower values are typically required in hot, sunny areas (e.g., Zones 2B and 3B) to reduce cooling loads.

HVAC Systems

System type: The baseline building system type depends on the building's size and function. For example, in small commercial buildings, the baseline HVAC system could be a packaged rooftop air conditioner. In larger commercial buildings, it might include chiller-based systems or variable air volume systems.

Efficiency rating: HVAC equipment in the baseline building will use the minimum efficiency standards that ASHRAE has set for the climate zone. In hot, humid climates like Karachi (Zone 1A), cooling system efficiencies will be a key metric, whereas for cold climates, heating system efficiency is more relevant.

Lighting

Lighting power density: ASHRAE 90.1 specifies baseline lighting power density (the amount of power that lighting uses per square foot or square meter) for different building types. The baseline typically assumes use of standard fluorescent or compact fluorescent lighting systems. In modern designs, efficient light-emitting diode lighting often surpasses this baseline.

Lighting controls: The baseline will specify basic lighting control requirements, such as occupancy sensors; advanced controls such as daylight harvesting may be required only in high-performance designs.

Service Water Heating

Water heater efficiency: The baseline model assumes use of standard-efficiency water heaters. In hotter climates such as Zones 1A and 2B, the focus would be on reducing standby heat losses and minimising the load on cooling systems. For colder climates, water heating becomes more significant in the overall energy balance of the building.

Ventilation and Air Leakage

Air infiltration: Baseline buildings have specific infiltration rates that indicate how much air leakage occurs through cracks and gaps in the building envelope. In hot-dry and hot-humid zones (1A, 2B), this is critical, because infiltration can significantly increase cooling loads.

Ventilation standards: Minimum outside air requirements are specified for maintaining indoor air quality, but excessive ventilation increases heating or cooling loads.

Renewable Energy

In most cases, the baseline does not assume the presence of renewable energy systems such as photovoltaics. These systems are considered to lower the energy consumption of the proposed building.

Baseline Building Characteristics: ECBC 2023

Building Envelope

Insulation and U-value: Sets limits for U-values (heat transfer rates) to reduce heat gain or loss through walls, roofs, and windows. These U-values are tailored to local climate conditions and building types. The lower the U-value, the better the insulation.

Solar heat gain coefficient: Defines SHGC values for windows and glass facades to reduce solar heat gain. These values vary depending on the window-to-wall ratio and are lower for buildings with large glass areas, ensuring that buildings are protected from excessive solar radiation.

HVAC Systems

System efficiency: Mandates minimum efficiency standards for HVAC systems. Efficiency ratings are climate adapted, with a focus on cooling for hot climates and heating for colder zones.

Passive ventilation: Encourages natural ventilation and passive cooling techniques, especially in frequently occupied areas, to reduce reliance on mechanical ventilation systems.

Lighting

Lighting power density: Prescribes limits on the amount of power that lighting systems use per square meter. These values are designed to ensure energy-efficient lighting solutions, such as light-emitting diode and compact fluorescent systems.

Lighting controls: Include provisions for automatic lighting controls, such as occupancy sensors and daylight harvesting, to minimise energy consumption when spaces are unoccupied or naturally lit.

Service Water Heating

Water heater efficiency: The baseline assumes standard-efficiency water heaters with insulation requirements to minimise energy loss, especially in commercial buildings and residential clusters.

Renewable water heating: Encourages use of solar water heating systems to reduce energy demand for heating water.

Ventilation and Air Leakage

Air infiltration: Establishes air leakage limits for windows, doors, and other openings, which are set to reduce uncontrolled ventilation, which can lead to energy loss in hot and cold climates.

Mechanical ventilation standards: Minimum ventilation rates are prescribed to ensure indoor air quality, without leading to excess energy consumption due to over-ventilation.

Renewable Energy

Photovoltaic systems: Promote integration of renewable energy systems such as solar photovoltaic panels on rooftops and façades, especially in commercial and large residential buildings.

Energy monitoring: The code encourages use of energy management systems to monitor and optimize energy use in buildings, supporting Pakistan's efforts to use sustainable building practices.

Comparison of U-Value Requirements

Table 7 compares U-values for building envelope components between ASHRAE 90.1 and ECBC 2023 for a specific climate zone 1A (Very Hot-Humid), which includes cities like Karachi, as an example for the comparison.

Table 7. Comparison of U-Values Between American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASRAE) 90.1 and Energy Conservation Building Code (ECBC) 2023

Component	ASHRAE 90.1 U-Value (W/m^2K)	ECBC 2023 U-Value (W/m^2K)
Exterior Walls	0.57 (maximum)	0.57 (maximum)
Roof	0.44 (maximum)	0.44 (maximum)
Windows		
Non-Metal Framed	2.87 (clear, SHGC ≤ 0.25)	3.50 (SHGC ≤ 0.35)
Metal Framed	5.80 (single glazed, SHGC ≤ 0.25)	2.50 (SHGC ≤ 0.35)

Notes: ASHRAE 90.1 U-values for windows and skylights vary based on glazing type (clear or tinted, single or double), frame type (metal or non-metal), and solar heat gain coefficient (SHGC).

ECBC 2023 generally prescribes slightly higher U-values for windows and doors, than ASHRAE making it less strict for some components, while maintaining similar U-values for walls and roofs.

Conclusion

Although it is not feasible to compare the baselines defined according to ASHRAE 90.1 and ECBC 2023 comprehensively because the requirements are specific to each climate zone, and it would require modelling sets of buildings to understand in detail the difference between them, the technical characteristics of both are similar.

The baseline characteristics of buildings under ECBC 2023 align with the goals of reducing energy consumption, improving insulation, and integrating renewable energy systems. Like ASHRAE 90.1, EBCB 2023 focuses on minimizing heat transfer, optimizing HVAC efficiency, and promoting energy-efficient lighting and water heating, but it also emphasises renewable energy adoption and passive design strategies tailored to Pakistan's climate and energy needs.

The PGT can use both references for activities in the construction sector, together with the evidence of a 20 percent reduction in energy consumption from the baseline calculated from either of these standards.

Annex 6. Scheme for the Environmental Management Plan, Measures for Prevention of Damage, and Environmental Benefits for Land Use Sectors

Environmental Management in the Property Plan
To enable adoption of environmental management to be evaluated, there must be a planning of the productive transition that includes specific data on the property, its location and productive context, and the modifications or improvements that the proponent wishes to make. The minimum information that the plan must include is: • **Characteristics of the area**, with supporting maps, including type of natural environment, production model, yields, challenges, and opportunities • **Objective of the investment**, modification or productive change • **Description of the environmental situation** of the property and the area. • **Definition of the transition**, with changes to be made, investments and inputs needed, the pathway to be followed, and the timeline specified Expected results with their respective impact indicators, such as an increase in productivity, efficiency in use of natural resources, and other metrics of improvement.

Following is a guide to measures to protect natural resources against harms associated with production that may be part of environmental management plans.

Table 8. Preventive Compliance Requirements for Resource Protection (DNSH-Do No Significant Harm)—Land Use Sectors

Protection of Natural Resources			
Protection of Healthy Ecosystems and Biodiversity	**Pollution Prevention and Control**	**Sustainable Use and Protection of Water Resources**	**Promotion of Circular Economy**
Avoid habitat modification. Protect natural forest areas. Set aside of at least 30 percent of the property for regeneration or conservation. Prevent introduction of non-native species or species with invasive tendencies. Have an agrochemical management plan and an integrated pest management plan.	Have an erosion mitigation plan in accordance with activities to be conducted.	Protect riparian corridors, wetlands, and other bodies of water. Protect and restore watershed tributary gallery forest. Demonstrate consistency with watershed, wetland, and other water resource management plans. Implement pollution control of high content of sediments, nutrients and agrochemicals. Regulate volume of water extracted and returned to natural sources, increasing efficiency of use per unit of production.	Use renewable energy. Use at least 20 percent local labour. Use at least 20 percent local raw materials. Improve alliances with local public, civil and private institutions.

Table 9 includes some measures to enhance environmental and productive benefits, including restoration, regeneration, rehabilitation, and recovery of natural systems and climate action, that can be broadly introduced in all sectors of land use.

Table 9. Measures to Enhance Environmental and Productive Benefits—Land Use Sectors

	Protection of Healthy Ecosystems and Biodiversity	Pollution Prevention and Control	Sustainable Use and Protection of Water Resources
Restoration and Promotion	Increase the diversity and abundance of species, seeking to connect non-degraded fragments and recover already-attenuated areas under a biological corridor or buffer zone approach. Plant and maintain vegetation: trees, shrubs, mangroves, and other natural ecosystems.	Use tillage techniques that involve minimal disturbance (reduction or elimination of tillage, biomass removal, overgrazing, burning of vegetation cover). Improve structure and porosity of soil using deep-rooted species adapted to the area according to soil and climatic conditions.	Reforest and restore areas of production, catchment, and regulation of water and microclimate. Restore, rehabilitate, or recover streams, springs, and wetlands with their corresponding gallery forests. Identify specific area to be restored.
	Encourage use of species that are native or compatible with the original habitat. Combat preexisting invasive species without disrupting the biological balance.	Modernize the management of humidity and surface runoff in vulnerable areas (dry and eroded).	Control transport and deposition of sediments, nutrients and agrochemicals. Stabilize sloping land through erosion control measures, and planting on contour lines, barriers, and living covers.
	Strengthen practices that allow rational use of nutrients and biological control of pests, diseases, and parasites, promoting development of desirable organisms that act as natural predators, decomposers, and parasitoids.	Measure organic matter content and biological activity as indicators of fertility.	Increase efficiency by identifying sources of water used and verifying consumption, losses, and yields. Promote establishment of water harvesting systems where justified. Indicate the goal of efficiency in property planning.
Climate Action: Adaptation	Promote establishment of water harvesting systems where justified. Indicate the goal of efficiency in property planning.	Prevent landslides and landslides in cycles of high precipitation. Prevent erosion due to wind action. Prevent desertification and other forms of climate degradation.	Reduce potential for reservoir sedimentation. Adjust water planning criteria. Protect and optimise water supply for non-agricultural uses Ensure minimum ecological flows (for freshwater and coastal ecosystem functions), especially during periods of water scarcity.

	Protection of Healthy Ecosystems and Biodiversity	Pollution Prevention and Control	Sustainable Use and Protection of Water Resources
Climate Action: Mitigation	Increase use of plant species that sequester more carbon. Protect forest, coastal, and marine habitats (blue carbon). Reduce methane emissions from agricultural waste management. Reduce emissions from biomass burning.	Increase and retain aboveground, groundwater, and soil carbon content by using good tillage and mulching practices with improved pastures and woody species in livestock systems. Reduce nitrogen oxides emissions in fertilized soils. Reduced use of nitrogen fertilisers.	Reduce methane emissions from treatment systems and water-intensive crops.

Annex 7. Suggested Outline for a Forest Management Plan

1. Introduction and Objectives of the Forest Management Plan

2. Description of Project Area (Provide geographic description of the property, including its location, boundaries, and size. This section should characterize natural resources in the area and socioeconomic context and identify relevant environmental authorities and legal requirements applicable to the project area.)

    2.1. Cartography and Georeferencing
    2.2. Identification of Areas
    2.3. History of Harvesting in the Project Area
    2.4. Physical Characteristics of the Area

        2.4.1. Topography and Soils
        2.4.2. Hydrology
        2.4.3. Climatology

    2.5. Biotic Characteristics of the Area, Including Ecosystems and Biodiversity
    2.6. Socioeconomic Features

3. Forest Inventory

    3.1. Cartography or Mapmaking of the Forest in the Project Area
    3.2. Design of Forest Sampling (identifying species and sampling size, method, and procedures)
    3.3. Results of Forest Inventory
    3.4. Floristic Aspects

4. Technical justification of the for species and its volumes (criteria applied and parameters for evaluating criteria employed and the justification)

5. Forest Census of the Species (location, species, volume, quantity, diameters)

6. Forest Harvesting Plan

    6.1. Forest Management Guidelines
    6.2. Silvicultural Plan (diagnosis of regeneration and proposed silvicultural treatments)
    6.3. Environmental Management and Social Factors
    6.4. Monitoring

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