RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:

Sector Division:

A. Basic Project Design Data

1. Dam height, m =_____
2. Surface area of reservoir, (ha) =_____
3. Estimated number of people to be displaced =_____
4. Rated power output, (MW) =_____

Other Considerations:

1. Water storage type: ___ reservoir ___ run of river
   ___ pumped storage
2. River diversion scheme: ___ trans-basin diversion ___ in-stream flow regulation
   ___ in-stream diversion
3. Type of power demand to address: ___ peak load ___ base load

Screening Questions	Yes	No	Remarks
B. Project Location Is the dam and/or Project facilities adjacent to or within any of the following areas?			
▪ Unregulated river			
▪ Undammed river tributaries below the proposed dam			
▪ Unique or aesthetically valuable land or water form			
▪ Special area for protecting biodiversity			
▪ Protected Area			
▪ Buffer zone of protected area			
▪ Primary forest			
▪ Range of endangered or threatened animals			
▪ Area used by indigenous peoples			
▪ Cultural heritage site			
▪ Wetland			
▪ Mangrove			
▪ Estuary			
C. Potential Environmental Impacts Will the Project cause…			
▪ short-term construction impacts such as soil erosion, deterioration of water and air quality, noise and vibration from construction equipment?			
▪ disturbance of large areas due to material quarrying?			
▪ disposal of large quantities of construction spoils?			
▪ clearing of large forested area for ancillary facilities and access road?			
▪ impounding of a long river stretch?			
▪ dryness (less than 50% of dry season mean flow) over a long downstream river stretch?			
▪ construction of permanent access road near or through forests?			
▪ creation of barriers for migratory land animals			
▪ loss of precious ecological values due to flooding of agricultural/forest areas, and wild lands and wildlife habitat; destruction of fish spawning/breeding and nursery grounds?			
▪ deterioration of downstream water quality due to anoxic water from the reservoir and sediments due to soil erosion?			
▪ significant diversion of water from one basin to another?			
▪ alternating dry and wet downstream conditions due to peaking operation of powerhouse?			
▪ significant modification of annual flood cycle affecting downstream ecosystem, people's sustenance and livelihoods?			
▪ loss or destruction of unique or aesthetically valuable land or water forms?			

Screening Questions	Yes	No	Remarks
▪ proliferation of aquatic weeds in reservoir and downstream impairing dam discharge, irrigation systems, navigation and fisheries, and increasing water loss through transpiration?			
▪ scouring of riverbed below dam?			
▪ downstream erosion of recipient river in trans-basin diversion?			
▪ increased flooding risk of recipient river in trans-basin diversion?			
▪ decreased groundwater recharge of downstream areas?			
▪ draining of downstream wetlands and riparian areas?			
▪ decline or change in fisheries below the dam due to reduced peak flows and floods, submersion of river stretches and resultant destruction of fish breeding and nursery grounds, and water quality changes?			
▪ loss of migratory fish species due to barrier imposed by the dam?			
▪ formation of sediment deposits at reservoir entrance, creating backwater effect and flooding and waterlogging upstream?			
▪ significant disruption of river sediment transport downstream due to trapping in reservoir?			
▪ environmental risk due to potential toxicity of sediments trapped behind the dams?			
▪ increased saltwater intrusion in estuary and low lands due to reduced river flows?			
▪ significant induced seismicity due to large reservoir size and potential environmental hazard from catastrophic failure of the dam?			
▪ cumulative effects due to its role as part of a cascade of dams/ reservoirs?			
▪ depletion of dissolved oxygen by large quantities of decaying plant material, fish mortality due to reduced dissolved oxygen content in water, algal blooms causing successive and temporary eutrophication, growth and proliferation of aquatic weeds?			
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?			
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?			
▪ creation of community slums following construction of the hydropower plant and its facilities?			
• social conflicts if workers from other regions or countries are hired?			
▪ uncontrolled human migration into the area, made possible by access roads and transmission lines?			
▪ disproportionate impacts on the poor, women, children or other vulnerable groups?			
▪ community health and safety risks due to the transport, storage, and use and/or disposal of materials likely to create physical, chemical and biological hazards?			

Screening Questions	Yes	No	Remarks
• risks to community safety due to both accidental and natural hazards, especially where the structural elements or components of the project (e.g., dams) are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?			

Climate Change and Disaster Risk Questions The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.	Yes	No	Remarks
• Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix I)? 1.			
▪ Does the Project use or depend on resources which could be affected by climate change such as changes in temperature, precipitation, or extreme events (e.g increased erosion which reduces generation efficiency, glacial melt which could affect generation potential)?			
▪ Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g. high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)?			
▪ Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g.. by diverting water from areas where drought is increasing, or encouraging settlement in earthquake zones)?			

Note: Hazards are potentially damaging physical events.

Appendix I: Environments, Hazards and Climate Changes

Environment	Natural Hazards and Climate Change	Example Impact on Hydropower
Arid/Semi-arid and desert environment	Low erratic rainfall of up to 500 mm rainfall per annum with periodic droughts and high rainfall variability. Low vegetative cover. Resilient ecosystems & complex pastoral and systems, but medium certainty that 10–20% of drylands degraded; 10-30% projected decrease in water availability in next 40 years; projected increase in drought duration and severity under climate change. Increased mobilization of sand dunes and other soils as vegetation cover declines; likely overall decrease in agricultural productivity, with rain-fed agriculture yield reduced by 30% or more by 2020. Earthquakes and other geophysical hazards may also occur in these environments.	Temperature increases reduce overall thermoelectric power generation efficiencies as well as water availability
Humid and sub-humid plains, foothills and hill country	More than 500 mm precipitation/yr. Resilient ecosystems & complex human pastoral and cropping systems. 10-30% projected decrease in water availability in next 40 years; projected increase in droughts, heatwaves and floods; increased erosion of loess-mantled landscapes by wind and water; increased gully erosion; landslides likely on steeper slopes. Likely overall decrease in agricultural productivity & compromised food production from variability, with rain-fed agriculture yield reduced by 30% or more by 2020. Increased incidence of forest and agriculture-based insect infestations. Earthquakes and other geophysical hazards may also occur in these environments.	Increased sediment load from intense rainfall events may result in rapid sedimentation of water reservoirs, causing reduced storage capacity of large hydropower projects.
River valleys/ deltas and estuaries and other low-lying coastal areas	River basins, deltas and estuaries in low-lying areas are vulnerable to riverine floods, storm surges associated with tropical cyclones/typhoons and sea level rise; natural (and human-induced) subsidence resulting from sediment compaction and ground water extraction; liquefaction of soft sediments as result of earthquake ground shaking. Tsunami possible/likely on some coasts. Lowland agri-business and subsistence farming in these regions at significant risk.	Increased sediment load may result in greater turbine erosion and lower turbine and generator efficiency, leading to less power generation, Changes to the hydrologic cycle and river runoff can result in changes in hydropower potential for electricity generation,
Small islands	Small islands generally have land areas of less than 10,000km^2 in area, though Papua New Guinea and Timor with much larger land areas are commonly included in lists of small island developing states. Low-lying islands are especially vulnerable to storm surge, tsunami and sea-level rise and, frequently, coastal erosion, with coral reefs threatened by ocean warming in some areas. Sea level rise is likely to threaten the limited ground water resources. High islands often experience high rainfall intensities, frequent landslides and tectonic environments in which landslides and earthquakes are not uncommon with (occasional) volcanic eruptions. Small islands may have low adaptive capacity and high adaptation costs relative to GDP.	Oil and gas refineries, storage infrastructure, transmissions lines, and other infrastructure in low lying coastal locations are increasingly at risk of damage, disruption and higher maintenance costs.

Environment	Natural Hazards and Climate Change	Example Impact on Hydropower
Mountain ecosystems	Accelerated glacial melting, rockfalls/landslides and glacial lake outburst floods, leading to increased debris flows, river bank erosion and floods and more extensive outwash plains and, possibly, more frequent wind erosion in intermontane valleys. Enhanced snow melt and fluctuating stream flows may produce seasonal floods and droughts. Melting of permafrost in some environments. Faunal and floral species migration. Earthquakes, landslides and other geophysical hazards may also occur in these environments.	The retreat of glaciers may increase water discharge and consequent power generation in the short term, and then be followed by a drastic reduction in summer flows and hence power generation.
Volcanic environments	Recently active volcanoes (erupted in last 10,000 years – see www.volcano.si.edu). Often fertile soils with intensive agriculture and landslides on steep slopes. Subject to earthquakes and volcanic eruptions including pyroclastic flows and mudflows/lahars and/or gas emissions and occasionally widespread ashfall.	Volcanic deposits in watersheds and reservoirs may educe hydro-potential