

# Adaptation to Climate Change in the RoadSector

Introduction and Methodology

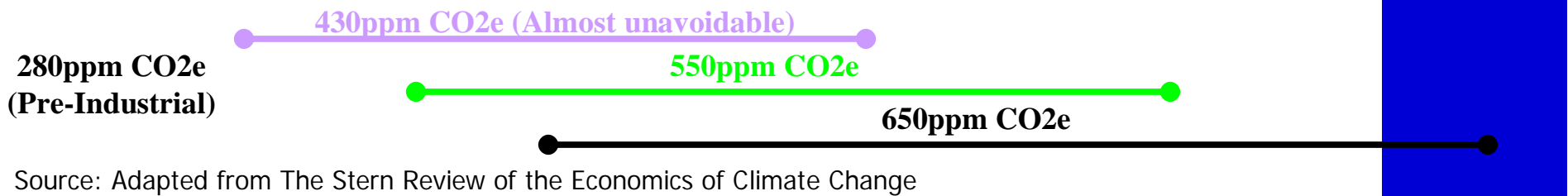
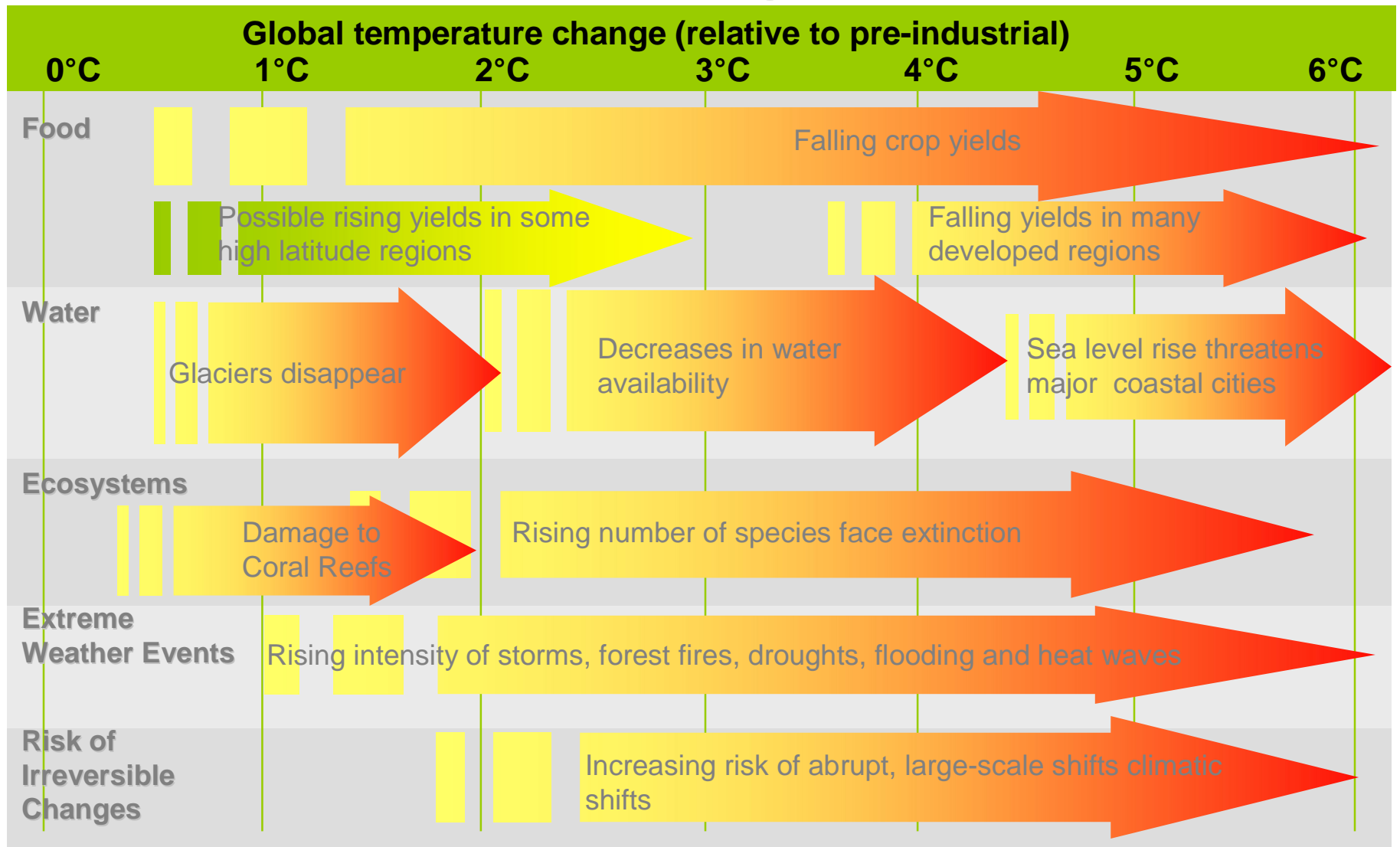
Jay Roop, Environment Specialist

ADB

# Impacts of Global Warming Already being Felt: Southeast Asia (1951-2000)

- **Temperature:** Increased 0.1–0.3° C per decade
- **Precipitation:** Trending downward
- **Sea Level:** Rose 1-3 cm per decade (not including rising acidification and temperature)
- **Extreme Weather:** Increased intensity and frequency of extreme events, such as heat waves, droughts, and storms

# Change

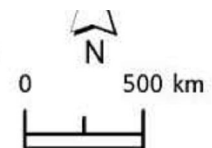


Source: Adapted from The Stern Review of the Economics of Climate Change



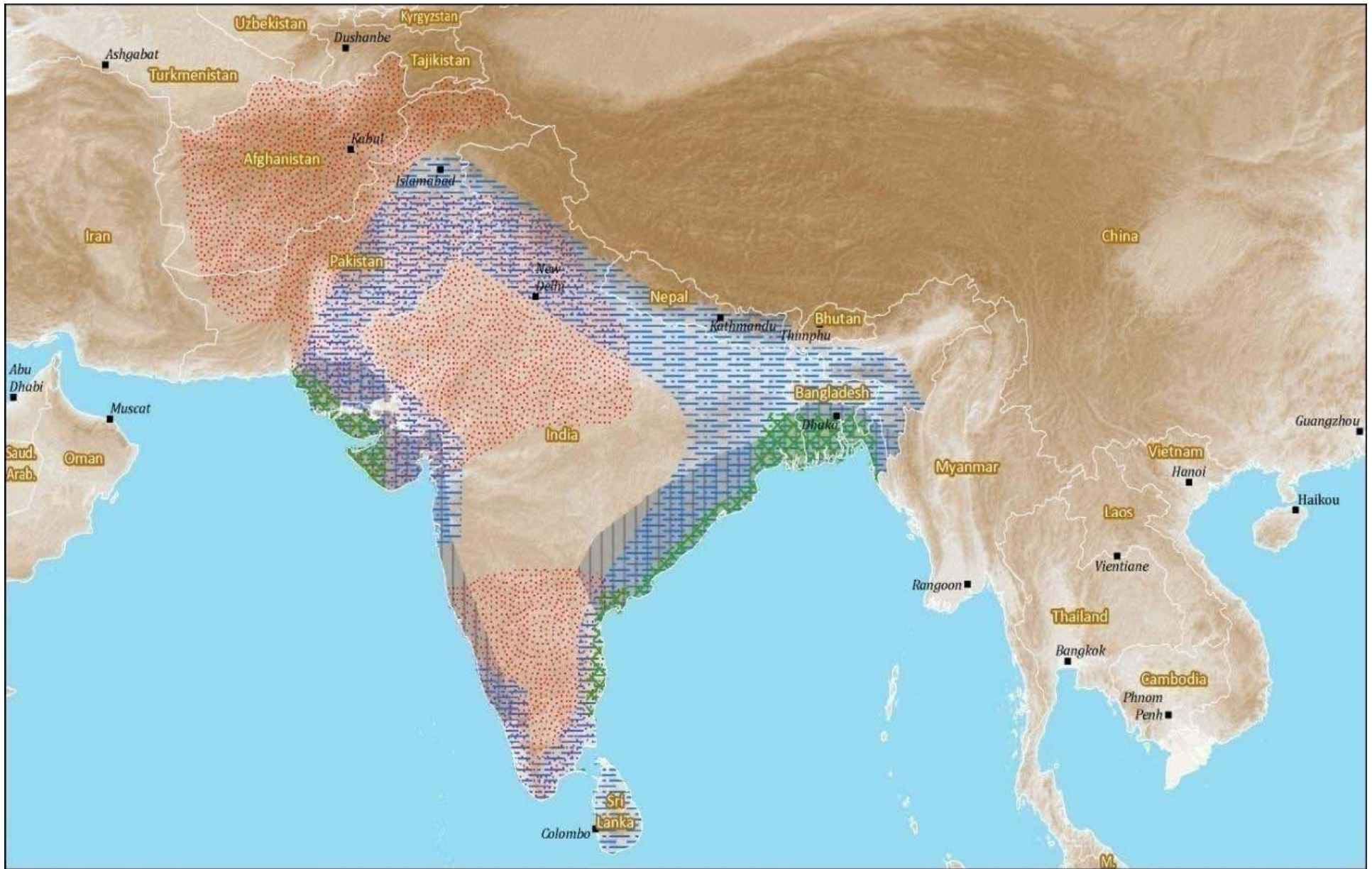
Additional Data Sources:  
 Global Rural-Urban Mapping Project, Center for International Earth Science Information Network (CIESIN), Columbia University; International Food Policy Research Institute (IFPRI); The World Bank; Centro Internacional de Agricultura Tropical (CIAT) 2005; USGS EOS Data Center; ArcWorld, ArcWorld Supplement

- Major Cities
- Countries
- ⊠ Coastal Flooding
- ▨ Cyclones / Typhoons
- ▬ Riparian Flooding
- ⋯ Water Stress



# SE Asia Climate Impacts

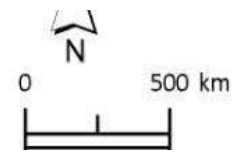




Additional Data Sources:  
 Global Rural-Urban Mapping Project, Center for International Earth Science Information Network (CIESIN), Columbia University; International Food Policy Research Institute (IFPRI); The World Bank; Centro Internacional de Agricultura Tropical (CIAT) 2005; USGS EOS Data Center; ArcWorld, ArcWorld Supplement

- Major Cities
- Countries
- Impact areas
  - Coastal Flooding
  - Cyclones / Typhoons
  - Riparian Flooding
  - Water Stress

## South Asia Climate Impacts

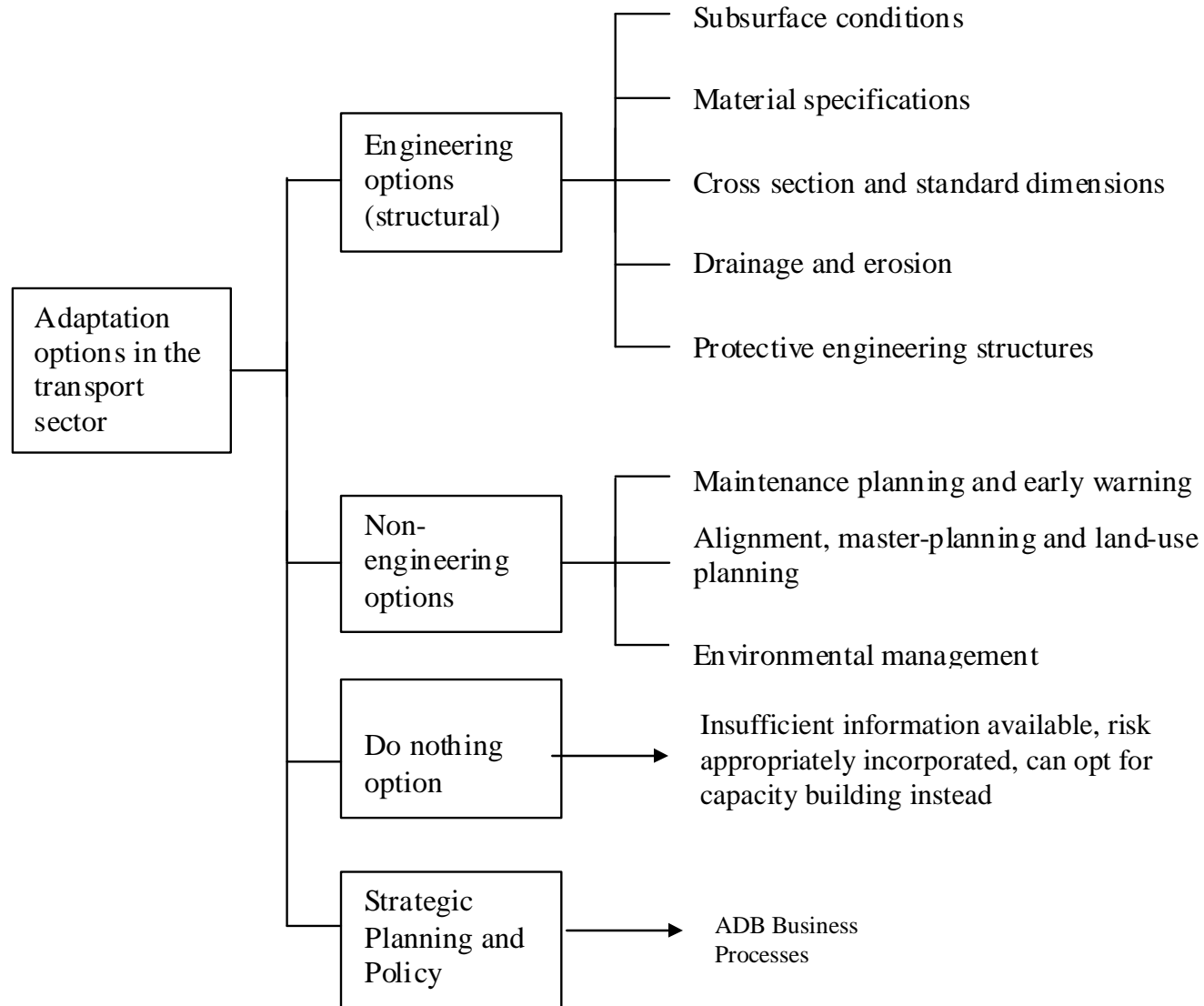


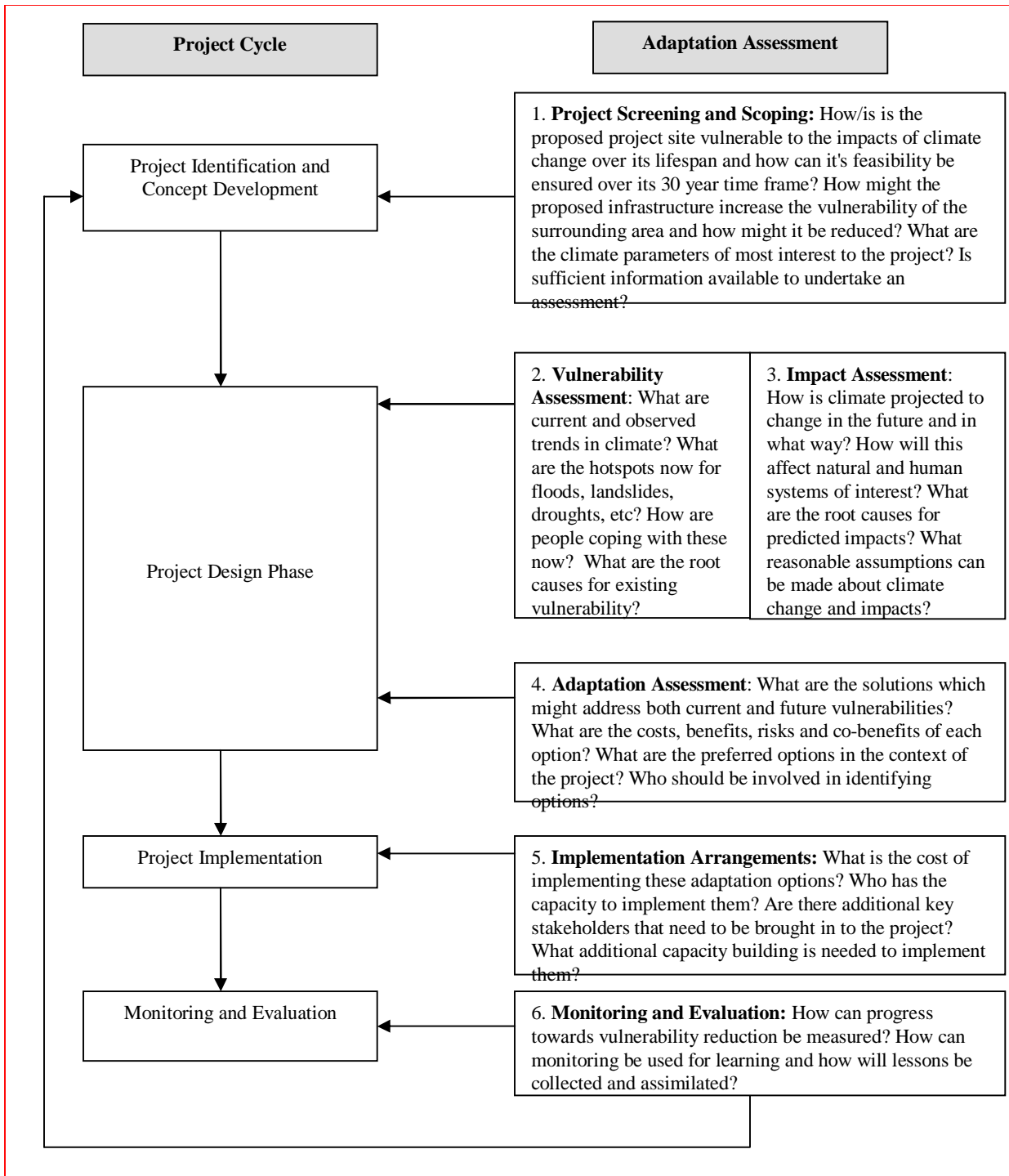
# Climate Change Impacts on the Transport Sector

## Examples

- Structural damage from storms, erosion, rainfall intensity, deformation, collapse of fill
- Permanent submerging from groundwater
- Reduced effectiveness of drainage
- Compaction of excessively dry materials
- Increase maintenance and road closures (i.e. mudflows)
- Carriageways covered by sand
- Corrosion from increased salinity

# Types of Adaptation in Transport





**Next: Project Case Studies**