

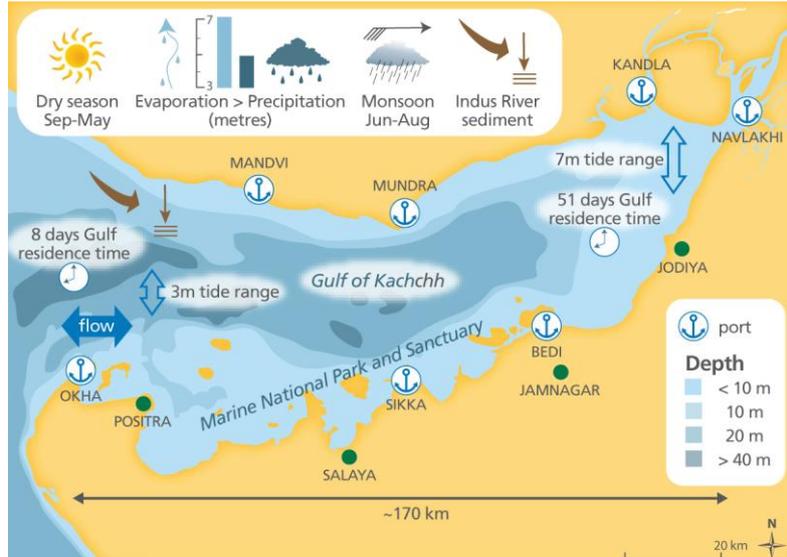
Assessment of Cumulative Coastal Environmental impactS (ACCES)

Majority of the world's population live in coastal zones, combining terrestrial-aquatic areas and revolving around the land–sea interface. Such areas face many environmental and management challenges, due to a combination of environmental impacts that arise in both open ocean areas and those areas inherent to coastlines, such as the impacts of *land based activities*. The high degree of complexity in coastal zones has led to emphasis on adoption of Integrated Coastal Zone Management (ICZM) as a governance mechanism by considering various aspects of human activities and their management. Cumulative Environmental Impact Assessment (CEIA) is an integral part of ICZM process, helps to detect cumulative impacts of development of the coastal/marine areas. It also helps to link the different scales of environmental assessment, focusing on how developmental plans are designed and the effects of a particular plan. Sustainable development of the coastal environment depends upon routine and defensible CEIA.

The CEIA process predicts the consequences of development relative to the assessment of existing environmental quality. Theoretically, it provides an on-going mechanism to consider possible impacts of the main activity and the resultant/expected associated ancillary activities, including increase in human settlement with associated amenities. It also helps in assessing whether the level of development exceeds the environment's assimilative capacity; *i.e.*, its ability to sustain itself. The scale of CEIA is beyond the scope of a small scale single developmental plan and requires broader temporal and spatial boundaries than those used in research studies for site-specific assessments. This research study is aimed to develop guidelines for conducting cumulative environmental impact assessment in coastal and marine areas.

i) *A Framework for Cumulative Environmental Impact Assessment, Gulf of Kachchh, Gujarat*

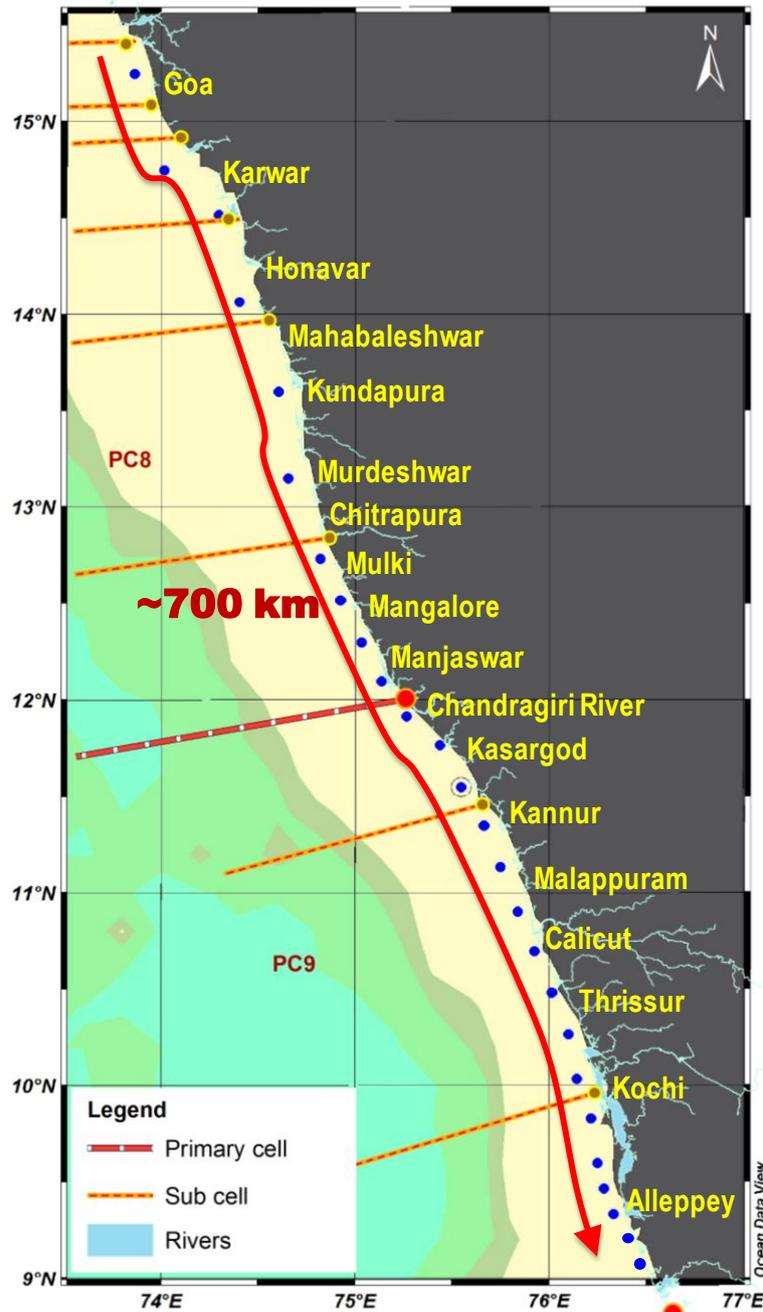
A Framework for Cumulative Environmental Impact Assessment for Gulf of Kachchh (GoK) is under preparation in consultation with national, international environmental experts and stakeholders, in a science workshop convened in co-ordination with University of Maryland Centre for Environment and Gujarat Ecology Commission (GEC), Gujarat. The assessment framework is a 5-step process that is done by identifying the natural resources and features of the GoK, and the potential pressures affecting them, leading to improved management plan for the region. Map Below depicting the physical features of the Gulf of Kachchh.



ii) Cumulative environmental impacts assessment along the Indian coast

For assessment along the Indian coast, a cruise on board CRV "Sagar Paschimi" was undertaken for the baseline survey of the coastal water and sediment, along the west coast of India from Goa to Kerala coast for a distance of nearly 700 km.

Map below showing the cruise track (Goa to Alleppey) along the west coast of India.



iii) Muddy LOICZ Nutrient Budget: Indian Coast

NCSCM Chennai for the first time in India has proposed to use the multi-box Muddy LOICZ approach for nutrient budgeting in the Indian coastal ecosystems such as lakes, lagoons, and estuaries. The Muddy LOICZ budget is the modified and updated version of the LOICZ model taking into account the effect of “**suspended particulate matter**” (K_d factor) in the budgeting. The coastal ecosystems proposed for nutrient budgeting from both east and west coast of India are shown below.



SPM Paradigm in nutrient budget: Kd Factor

The partition coefficient (K_d), defined as the ratio between particulate nutrient concentration and total nutrient concentration, vary from region to region and is site specific. For the site specific model calculations, K_d factor can be derived from the measured nutrient concentrations. The K_d factor derived for Chilika Lake is shown below.

