

## Research paper

# Introducing landscape character assessment and the ecosystem service approach to India: A case study

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## ABSTRACT

Landscape Character Assessment has provided the context for land use planning decisions and for identifying priorities for environmental restoration and enhancement in England since the 1990s. Increasing awareness of the importance of ecosystem services has led to the method being refined in order to enable informed management of change, with the inclusion of socioeconomic data and the identification of strategic management objectives providing an integrated approach to sustainable development in a changing This research, funded by the British Council UK-India Education and Research Initiative (UKIERI), was prompted by concerns expressed by ecologists about the increase in the extent of an invasive plant species, *Prosopis juliflora*, in the district of Kachchh, Gujarat. A combination of Landscape Character Assessment and participatory appraisal were used in order to produce a Natural Character Area profile for the coastal plain. The process revealed that concerns regarding the spread of *Prosopis* were outweighed by its socio-economic importance as a source of fuel, charcoal, honey and gum. Their most pressing concern was the impact of recent industrial development on the environment, in particular water abstraction and pollution, crop predation by livestock and increasing soil salinity.

## 1. Introduction

Rapid population growth and the consequent strain on limited resources increase the importance of appropriate land use and urban planning measures. In recent years most societies and governments have understood the relationship between healthy ecosystems and economic growth and have set objectives and measures to maximise sustainable development via their land use planning system.

The importance of ecosystem services for human health and well-being and economic systems has been extensively researched in Europe (e.g. European Environment Agency, 2013; Millennium Ecosystem Assessment, 2005; UK National Ecosystem Assessment, 2011). The UK has integrated this approach into land use decision making, taking into account the value of ecosystem services and the ‘cost’ of inappropriate decisions (Owens and Cowell, 2011; Rydin, 1995). Using Landscape Character Assessment as a tool to better understand the relationship between people and place can help make informed judgements, planning decisions and management of environmental change, and enhance the quality of environmental assessments (Potschin and Haines-Young, 2013).

Incorporating landscape assessment in this way was first implemented as the Environmental Capital Approach, piloted in the

1990s. This involved experts conducting a desk study, followed by Landscape Character Assessment, in order to identify and describe the specific features of a particular landscape. This was followed by a participatory exercise to determine which landscape attributes were valued and why these were felt to be important. The results of these exercises were then brought together, combining the professional/expert perspective with that of stakeholders. This provided insight into the interaction between the physical and socio-economic attributes that makes places distinct from each other, identifying important features, and enabling an assessment of the scale of importance of the associated ecosystem services and whether these could be replaced or substituted by others.

Ecosystem services and landscape character are different, but related, concepts. The former aims to assess the value of the natural environment, while the latter focuses on perception and preference. Combining the two techniques is a powerful tool for decision-making and sustainable development (Landscape Institute, 2016; Tudor, 2014). The fundamental difference between these and other policy support tools lies in the division of the study area into natural – rather than administrative – units. The boundaries are drawn after carrying out a Natural Character Area (hereafter NCA) profiling exercise and defined by a combination of environmental, cultural and economic features.

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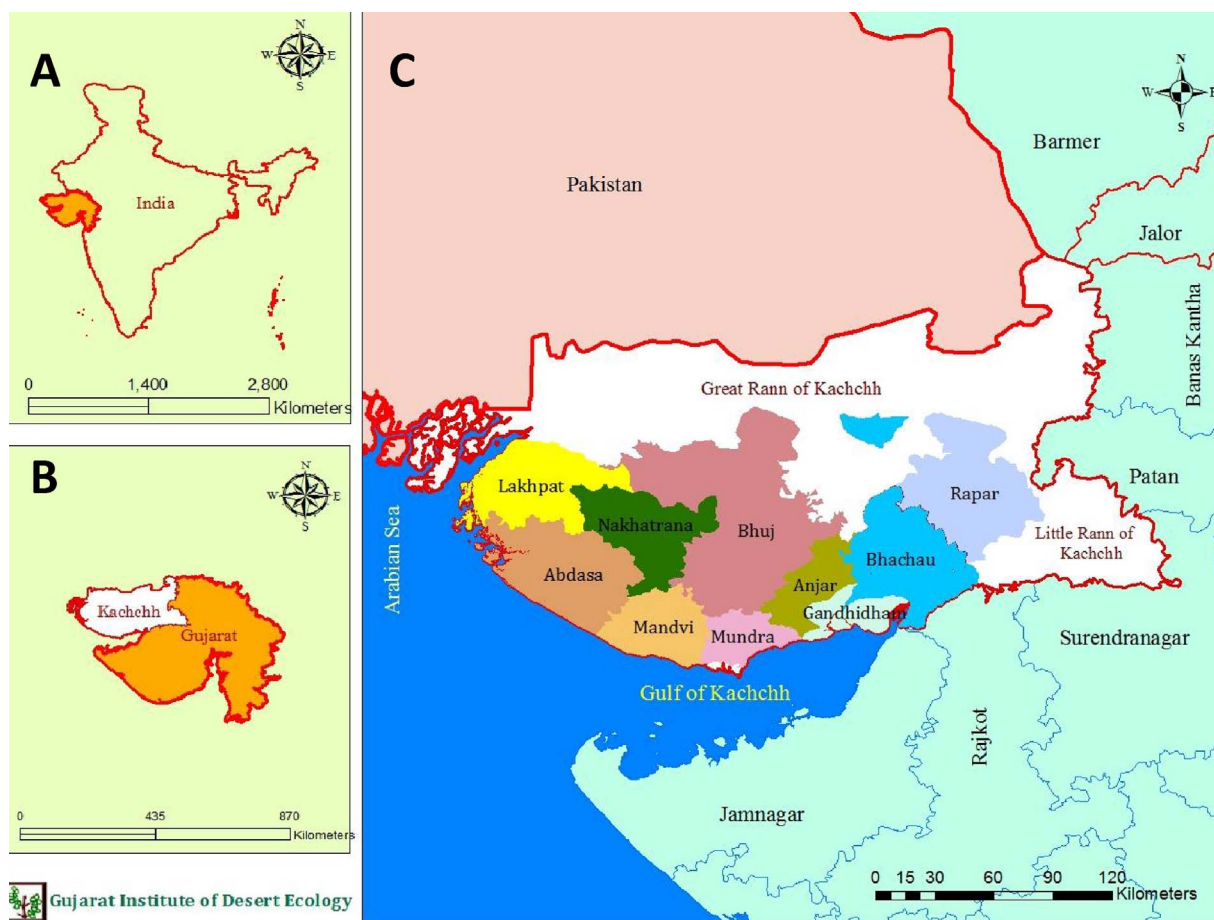


Fig. 1. Map showing the location of Gujarat state in India (A); map showing the location of Kachchh district in Gujarat (B); map showing the talukas of Kachchh (C).

The NCA profile describes how the landscape has changed over time and identifies the drivers behind these changes, enabling an analysis of the ecosystem services. This has been done for the whole of England and the NCA profiles are available on the internet as guidance documents for decision makers, enabling access to natural and cultural heritage as well as pertinent socio-economic information (Natural England, 2014).

Developing countries offer an opportunity to incorporate these approaches before the industrialisation process adversely affects the environment. Many biodiversity hot spots are located in tropical countries where, until recently, human activities have had little impact. While preservation of natural ecosystems should neither prevent development nor disadvantage the well-being of local communities, an integrated approach to land use planning, balancing environmental conservation and economic growth, is desirable. The Natural Character Area approach is proposed as a way to achieve this.

India has seen a dramatic increase in both population and industrial activity in recent years. Positive consequences have included improved communications and literacy (Ministry of Finance, 2014); however, in places poorly planned growth has exacerbated social inequalities, damaged the environment and compromised the delivery of ecosystem services. Environmental Impact Assessment (EIA) was introduced in 1994 and has since become an integral part of the decision-making process. However, while the legislative provisions and guidelines are quite comprehensive, weak enforcement, including the inability to impose fines, is resulting in many developments taking place without undergoing an EIA, despite their potential to cause environmental and socio-economic impacts. A recent assessment of the EIA system in India revealed a lack of coordination between the various authorities involved, inadequate screening and scoping, lack of expertise among EIA

professionals, and inadequate implementation of mitigation measures and monitoring. In contrast to many countries, where public involvement is mandatory at various stages of the EIA process (i.e. screening, scoping, report preparation and decision making), in India consultation occurs only once, just before decision making, and the points raised by the public are rarely taken into account (Panigrahi and Amirapu, 2012).

The state of Gujarat is the second most industrialised state in India and its rapid development has had a marked impact on the environment, local communities and their livelihoods (Awasthi, 2000). This study focused on the coastal plain of Kachchh district, located in the north-western part of Gujarat. The national census of 2011 recorded Kachchh as having experienced a population increase of 32.16% in the preceding decade; the 2001 census showed an increase of 25.4% since 1991 (Kachchh District census 2011 data). The coastal plain is composed of a mosaic of different ecosystems, such as coral reefs, mangroves, mudflats, creeks and estuaries, with many villagers dependent on these for their livelihoods. Those involved in salt production and fishing are dependent on the sea, while land based occupations include agriculture, horticulture and animal husbandry (Ministry of Environment, Forests and Climate Change and GIZ, 2014). The area is undergoing significant change, with industrial development, combined with climate and sea level rise, affecting traditional livelihoods. Fish production is reported to have decreased dramatically, with pollution combined with displacement resulting from the building of industrial plants being the likely cause (Fishmarc and Kutch Nav Nirman Abhiyan, 2010). Mangroves, the breeding grounds for many local species of fish, have been destroyed to make way for industry (Dixit, Kumar, Kumar, Pathak, & Patel, 2010). Industrial plants also consume large quantities of freshwater and this, combined with a change in rainfall patterns, has contributed to a fall in the water table, followed by the incursion of sea

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