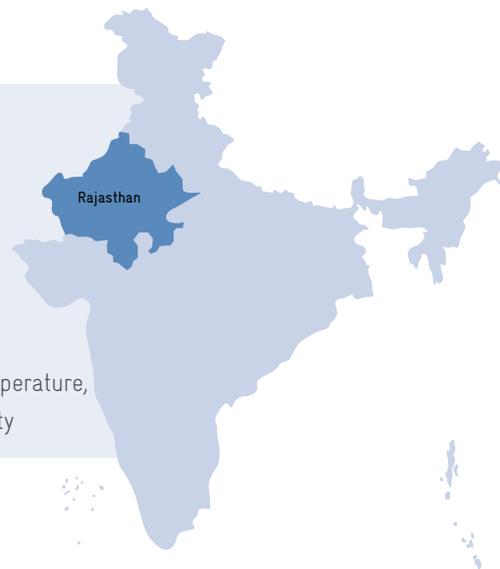


Using Vegetation to Stabilise Sand Dunes

State:	Rajasthan
Location:	Sangad village in Jaisalmer and Shaitrawa village in Jodhpur
Project duration:	December 2011 – March 2014
Project implementation:	Department of Forest, Government of Rajasthan
Geographic features:	Thar Desert
Climate stress:	Low and erratic rainfall, high air and soil temperature, intense solar radiation and high wind velocity



Project context and need for adaptation

The Thar Desert in western Rajasthan is India's largest desert, covering about 70 per cent of the state's land-mass. Due to global warming, this hot and arid region is expected to suffer extensive desertification over the next hundred years. This trend can also be traced to resource overuse and strong winds. In many places the vegetation on formerly stable dunes has been seriously damaged or destroyed and has led to their reactivation. As a result the sustainability of Rajasthan's agriculture, infrastructure and land resources is threatened.

Despite the implementation of various desertification control and sand dune fixation programmes in the region, overgrazing, human exploitation and the absence of

multiple layers of vegetation have led to a noticeable expansion of gaps in the vegetation cover on sand dunes. The resulting reactivation of formerly stabilised sand dunes leads to the exposure of roots and, in many places, to tree-uprooting. This unfortunate trend calls for a re-examination and reformulation of strategies to nurture dune vegetation.

The project is responding to the situation with an innovative strategy to stabilise sand dunes by using sequential restoration of vegetation where reactivating dunes are at work. The project seeks to introduce a multi-tier green cover with indigenous species of grasses, shrubs and trees to enrich vegetation and thus enhance biodiversity. This has not previously been possible in these moving dunes. The species selection strategy gives native and naturally



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occurring tree species preference over exotic varieties. The project also takes into account the utilitarian potential of these species in providing livelihoods.

In the area around Shaitrawa village, communities are already feeling the positive impacts of earlier sand dune stabilisation efforts. Their farmlands are better protected, their wells have more water, there is less migration as a result of droughts, and fuel wood is in better supply, as is fodder for livestock. Thus, sequential stabilisation of sand dunes provides livelihood opportunities as well as protection against intensive desertification.

Adaptation hypothesis

Sequential restoration of reactivating sand dunes using multiple layers of indigenous vegetation enriches biodiversity and makes ecosystems function better. It also provides goods for livelihoods and protects local infrastructures from damage caused by desertification. This, in turn, enhances the resilience of ecological, social and economic systems and improves the adaptive capacities of vulnerable communities.

Project activities

The project combines a number of innovative techniques, methods and management strategies that go beyond current field practices for sand dune stabilisation. First, a survey was carried out to assess the present vegetation

cover and identify gaps where bare sand patches and sand dunes occur.

The dunes that were formerly stabilised but now face reactivation have been selected for implementation of sequential stabilisation. In such dunes, the composition and density of vegetation, and the nature and extent of reactivating bare patches must first be ascertained. After this, an appropriate plant density can be achieved through direct sowing and planting. Once these measures have been taken, the regeneration area is fenced off to guard it from encroachments by grazing animals. The next step is mulching along micro-windbreaks on the dune slopes by burying local shrubs upside-down in the sand in parallel strips.

After mulching, the seeds of creepers, grass, shrubs and smaller trees are sowed along the windbreaks. Saplings of larger tree species – the top tier of the vegetation – are raised in nurseries to be planted with the onset of monsoon. Plants are watered to ensure their survival during the long dry season.

Responsibility for maintenance and protection of the plantings is shared between Rajasthan's Forest Department and the village communities. Each community elects representatives to form a Village Forest Protection and Management Committee, which is responsible for enforcement at the local level. Thus training and community development activities are also a part of the project.

This project is a joint undertaking of the project Climate Change Adaptation in Rural Areas of India (CCA RAI) and the Forest Department of the Government of Rajasthan.

CCA RAI is an Indo-German development project that aims to strengthen the efforts of rural communities in India to cope with climate variability and change. CCA RAI is implemented by the Indian Ministry of Environment and Forests and the German development organisation GIZ. It is financed by the German Federal Ministry for Economic Cooperation and Development. Rajasthan is one of CCA RAI's four partner states in India. The main responsibilities of CCA RAI in this project are financing, technical support and institutional capacity building.

The Forest Department of the Government of Rajasthan is responsible for the management of forests and wildlife within the state. It is currently implementing three major legislative acts: the Rajasthan Forest Act of 1953, the Indian Wildlife Protection Act of 1972 and the Forest Conservation Act of 1980. The various activities undertaken by the department include forest protection, forest develop-

ment, wildlife management, soil and moisture conservation, forest planning, harvesting, ecotourism, research, awareness raising and training.

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