India's arid-zone forest biodiversity at risk

In arid and semi-arid forests in India, commonly held lands are havens for biodiversity, but many need restoration

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Shrub land: Relatively well-stocked *gauchar* land in the arid zone of western Rajasthan. *Photo: P. Chaudhry*

Rajasthan is the largest state in India by area, occupying 10.4% of the country's landmass. It features one of the world's oldest mountain systems, the Aravalli Range, which stretches southwest from the national capital, Delhi, to Gujarat state. Two-thirds of Rajasthan, to the west of the Aravalli Range, comprises part of the Great Indian Desert known as the Thar Desert.

The economy of the arid districts in the Thar Desert is largely livestock-based, with the land unable to support much crop-based agriculture. Animal husbandry provides income and other essential requirements, such as milk, meat, fibre and manure. In almost every village in western Rajasthan since time immemorial, a substantial portion of the land has been set aside specifically as grazing land to support animal husbandry on a sustainable basis. Such grazing lands often serve as catchment areas for village ponds, too, and are commonly known as *gauchars* (*gau* = cattle and *char* = grazing). To discourage tree cutting, some *gauchars* have been pledged to local deities, gods, goddesses and legendary heroes (who are supposed to protect the villagers and their animals) and are known as *orans*. According to some, the word *oran* derives from the Sanskrit word *aranya*, which means forest or wilderness, while others believe that it derives from *aan*, which means 'pledged'.

Orans and *gauchars* are the most important common-property resources in rural western Rajasthan, with *orans* accounting for an estimated 8–9% of the arid parts of Rajasthan (Mitra and Paul 1994).The area of an *oran* can vary from a few square metres to several thousand hectares: among the larger *orans*, the Bhadriya *Oran* in Jaisalmer district has an area of about 15 000 hectares, the Baankal Devi ka *Oran* is spread over 4600 hectares, and the Kundla *Oran* in the Barmer district covers about 7500 hectares (Gokhale et al. 1998; Singh and Bahl 2006; Singh 2009).

Present status

In the past, *gauchars* and *orans* were the mainstay of livestock farming in the region. The productivity of these areas has decreased, however, due to heavy pressure from grazing. The continual overgrazing of naturally growing palatable grassy legumes and shrubs, such as sevan (*Lasiurus sindicus*), dhaman (*Cenchrus ciliaris*), bhurat (*C. biflorus*), anajn (*C. setigenus*), dhamnio (*C. pennisetiformis*), tantia (*Daeetyloctemimum sindicum*), shinio (*Crotalaria burhia*), santo (*Trianthema portulacastrum*), kanti (*Tribulus terrestris)*, bordi (*Ziziphus nummularia*), bar bordi (*Z. mauritiana*) and kandero (*Maytenus emarginatus*), especially in the pre-seeding period, has adversely affected seed production and regeneration. This, in turn, has resulted in the gradual replacement of palatable plants by unpalatable grasses and shrubs such as bihani (*Tephrosia purpurea* and *T. wallichii*), bui (*Aerva pseudotomentosa*), bekario (*Indigofera cordifolia*), kheemp (*Leptodenia pyrotechnica*), aak (*Calotropis procera*) and ker (*Capparis decidua*). Large areas of *gauchars* and *orans* have become totally bereft of palatable grasses and shrubs, greatly decreasing their capacity to support livestock on a sustained basis.

Most *gauchars* and *orans* are unique in the role they play in gene-pool conservation, and this role is a direct outcome of the sociocultural value system in Rajasthan. However,

traditional approaches to biodiversity conservation have attracted little attention from scientists, foresters, academicians and policy-makers; therefore, there is an urgent need to systematically survey, demarcate and conduct research in all existing *gauchars* and *orans* in Rajasthan (Singh and Bahl 2006). A few notable non-governmental organizations, like KRAPAVIS (based in Rajasthan's Alwar district), are active in the revival of *orans*. To date, KRAPAVIS has restored around 100 *orans* in Rajasthan, which has led to dramatic improvements in the livelihoods of the associated rural communities and has particularly benefited the women in those communities (Singh 2009).

Most of the restored *orans* are in semi-arid areas, however, and a district-by-district inventory of *gauchars* and *orans* in the state's arid lands is yet to be conducted. Moreover, *gauchars* and *orans* are not classified and defined properly in state government 'revenue records', often being categorized simply as 'cultivable waste land'. In some instances, the state government has allocated *gauchar* and *oran* lands to industry and to landless people without the consent of local communities. The forced conversion of such areas into 'revenue allotments' and the regularization of encroachment on revenue land have been done without following the provisions of the Forest (Conservation) Act, 1980. This Act is applicable to all kinds of forest lands diverted for non-forestry purposes, and the permission of the central government is required for such diversion. *Gauchars* and *orans*, however, escape the provisions of the Act because their legal status is not recorded as forestland in most revenue records. Faced with severely depleted grazing lands and water sources, local people in many parts of the state have taken to plundering sacred groves. For example, the Karoli Kund *Oran* in the Alwar district (Singh and Bahl 2006) and *orans* near Jodhpur are threatened by mining and stone-quarrying. There is a need, therefore, to declare these lands to be forestlands and to give them legal protection from diversion for non-forestry purposes.

Planning rehabilitation

Prior to Indian independence, a system of village institutions—both informal and caste-based—known as *panchayats* prescribed rules of social behaviour and guided the behaviour of villagers on the use of common resources, especially *gauchars* and *orans*. These rules concerned, among other things, the rotation of grazing; periodic restrictions on certain kinds of animal; top-lopping; restrictions on woodcutting; and the use of watchmen to keep an eye out for offenders (Jodha 1990). Over time, however, many of these rules have lost their relevance and impact (Jodha 1985; Brara 1987; Anantram 1988). Changes in lifestyle, approaches to education and moral and ethical values, and the disruption of family systems seem to be some of the reasons for a decline in the effectiveness of local *panchayats* in implementing rules for the conservation of common resources.

In planning rehabilitation measures for *gauchars* and *orans*, the following points should be kept in mind:

- When undertaking restoration, the local people must be taken into full confidence. They should be involved actively in the planning and execution of restoration activities. They will also need to be reassured that the restoration effort is being undertaken for their benefit and that the implementing agency does not have any intention of grabbing the land.
- The species to be planted in the restoration of *gauchars* and *orans* should be selected carefully and with a view to bridging the gap between the demand for and supply of woodfuel, fodder, small timber and other forest products, prioritized in consultation with the local people.
- A detailed analysis of the optimum requirements for inputs such as irrigation, farmyard manure and fencing to ensure the optimum growth and survival of seedlings during restoration efforts should be carried out for the various selected species. All future proposals for the restoration of *gauchar* and *oran* lands should be prepared on the basis of the optimum requirements for various inputs, as identified above.
- The present overreliance on hardy exotic species that can survive with minimal inputs and care should be discontinued. In their place, local species that can produce high outputs of fodder, woodfuel and timber, allow palatable grasses and legumes species to grow under them, and withstand the harsh environment in the region should be preferred. Some such local species with potential in restoration are khejdi (*Prosopis ceneraria*), rohida (*Tecomella undulata*), kandero, neem (*Azadirachta indica*), kumat (*Acacia senegal*), ardu (*Ailanthus excelsa*), mopane (*Colophospermum mopane*), anjan (*Hardwickia binata*) and desi babool (*Acacia nilitica*).
- To prevent the recurrence of problems caused by *Prosopis juliflora*, no new exotic species should be introduced to the region without a detailed analysis of their impact on native flora in general and on desert ecosystems in particular.
- Projects and schemes for the restoration of *gauchars* and *orans* should include contingency plans in the case of drought and could include, for example, provisions for the additional watering of plants to avoid large-scale drought-related mortality.

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