SUSTAINABLE BUILDING

EXAMPLES OF GOOD PRACTICE

LODGES IN TRADITIONAL AND CONTEMPORARY STYLE

Tiger Tops Tharu Lodge is built in the traditional Tharu longhouse style with local materials and labour.

The traditional design and use of local materials and furnishings is carried through the interior design.

Water is heated using solar power. Wastewater is treated in septic tanks. Read more in case study.

Kanha Earth Lodge, a winner of the All India Stone Architectural Awards, incorporates contemporary and traditional design. Buildings are made from locally sourced stone, mud plaster, terracotta tiles and recycled or sustainably sourced timber.

Guest cottages constructed with local materials reflect local Gond tribal architecture. Grounds restored with indigenous trees and grasses are left natural.

The common area exploits the use of natural light and air. Furniture is made from waste wood and recycled railway sleepers. Roofs are triple layered to trap air to keep interiors cool to help conserve energy. Read more in case study.

Large windows and sliding doors maximise the use of natural light and ventilation at Dhole’s Den.

High ceilings, combined with tree planting and wide eaves enable rooms to be kept cool without fans or air conditioning.

A 10 kwh micro wind and solar power hybrid generator produces power to meet all the lodge’s energy needs apart from the water pump. Read more in case study.

Guest cottages at Forsyth Lodge are built with local materials using compressed mud, straw, claw tiles in the local style to blend into the surrounding area. A natural thicket fence is used around the property to avoid injuries to wildlife.

All guest rooms have a master key one switch system to save electricity.

Lily ponds outside each guest room are part of a natural water treatment system enabling grey water to be recycled. (See Water Conservation and Treatment profile case study).
LARGER LODGES/RESORTS

The main buildings and 52 guest cottages at *Spice Village Thekkady* are inspired by the indigenous dwellings of the local Mannan tribe using local wood, elephant grass thatch and wide eaves. Furniture is made from upcycled pine cases. Infrastructure includes solar power, a biogas plant, effluent and sewage treatment plants enabling water to be recycled, recycling facilities and a 78-tank vermicomposting system. Read more in case study.

Guest accommodation and facilities at *Evolve Back Kabini* are built to reflect the local vernacular style and include an interpretation centre with a museum, butterfly garden and lily pond. Interiors are designed to exploit natural ventilation and light to minimise energy use. The resort is carbon positive thanks to two off-site wind farms. It also uses on-site solar power amongst a range of positive eco practices. Read more in case study.

*Barahi Jungle Lodge* with 34 guest rooms and one family suite combines contemporary design with local materials. Grounds have been extensively restored and left wild. Water is heated using solar thermal. Large windows maximise natural light with shading provided by thatched balconies. Interiors blend contemporary and traditional Nepalese furnishing using natural materials such as wood, bamboo and elephant grass. Read more in case study.
HERITAGE

Set in 40 acres of indigenous trees, grasses and shrubs left natural, Mahua Kothi – Taj Safaris has tastefully renovated the original homestead retaining its period features. Grounds include a large organic kitchen garden.

Twelve guest cottages or kutiyas (jungle village huts) have been built to reflect the local vernacular style. Each cottage is accessed via a spacious private courtyard with shaded seating and traditional stone floor. Walls are made with mud and husk for natural insulation. Handmade local pottery tiles are used for the roofs.

Interiors continue the traditional theme with wooden shutters, hand plastered mud walls washed with lime, and roughly hewn wooden rafters. Floors are dressed in katni stone strips set in mortar. The rooms are decorated with wooden puppets and geometric tribal patterns reflecting local culture.

Mela Kothi – the Chambal Safari Lodge has transformed a 19th century heritage property into an eco-enterprise maintaining the integrity of the period features.

Guest accommodation has been built in traditional style to reflect local architecture using local materials. Trees planted throughout the site help to provide natural cooling.

Energy is conserved by the extensive use of LED lights. Water is conserved through the installation of aerated water taps, low-flow showerheads and dual flush toilets. Natural pathways, tree planting and water bodies help to replenish ground water.

TREEHOUSE

Construction of Pench Tree Lodge was limited to 2% of the area. No trees were felled during construction. The landscape has been left natural and extensively restored with indigenous planting. Rainwater harvesting helps to recharge ground water levels.

The six tree houses are built out of local sal wood from approved forestry sources and recycled timber. Rooms and bathrooms have been designed to maximise natural light and air with natural cooling provided by the trees.

To reduce the building’s carbon footprint, the design utilised an existing water tower and foundation for a large dining hall for the seating and dining area. Read more in case study.
Treehouse Hideaway is designed to blend seamlessly into its forested environment with only five tree houses and a lounge and dining area built around a tree, pictured here. Natural light is maximised with 360-degree views of the undisturbed surrounding wooded landscape. Wood, the predominant material, is recycled timber or from approved forestry sources.

The 21-acre grounds include a substantial water body for wildlife and rainwater harvesting, with a discrete machan providing an inspiring platform for wildlife watching with lodge naturalists, and alfresco dining.

Furniture is crafted from recycled and sustainably sourced timber. The five guest rooms have star rated energy efficient water geysers and air conditioning and a one switch system to minimise energy use. Bathrooms feature dual flush toilets to minimise water use. Guests are encouraged to save water and energy through notices.

Banjaar Tola – Taj Safaris is designed with a light footprint to protect the riverine environment with eighteen tented suites set in 90 acres extensively planted with indigenous trees, grasses and shrubs. Pathways are left natural avoiding the use of concrete. There is no fencing towards the core zone of the park and Banjaar River to enable the free passage of wildlife.

Large glass doors exploit natural light. Wall panels and flooring are made of bamboo, a fast growing, sustainable material. Roofs are made of canvas. Rooms throughout the lodge are decorated with local Bastar and Dogra handicrafts.

A key one switch system and LED bulbs are used to conserve energy. Aerated taps and dual flush toilets help to conserve water. Indigenous planting and a water body help to recharge groundwater. Black (sewage) wastewater is treated in septic tanks. Bath and kitchen water is recycled through soak pits and allowed to percolate back into the ground.

Tents at Khem Villas, part of their accommodation offer, are set in a restored landscape and made from local canvas.

Showers use natural materials including bamboo. Aerated taps, low flow showerheads and dual flush toilets are used to minimise water use.

Water is heated by solar power backed up by heat-pumps, an energy efficient technology. Grey water is recycled into the lodge’s ponds after going through a grease trap and reed filter.
Providing facilities for the differently abled is good practice followed by a range of lodges. Pictured here, Jaagir Lodge which has a guest room catering for special needs. Ramps are available to provide access to shared public spaces.

Noise free and less polluting diesel generator sets to control noise and emissions are in wide use, pictured here at Aahana, The Corbett Wilderness. Aahana has constructed an underground conference hall to control noise levels.

Vanghat Lodge uses no exterior lighting to avoid light pollution in a landscape which now sees migrating elephants pass by in a restored landscape where previously only a solitary male was to be found.

The landscape at Khem Villas has been extensively restored with indigenous trees, shrubs, grasses and six water bodies. The cottages and villas are roofed with local thatch to blend into the landscape. Rainwater harvesting combined with landscaping and water conservation measures allows the lodge to put back more water than it consumes. See Water Conservation and Treatment profile case study.

Only about 5% of Reni Pani lodge’s 35 acres are built on; the remaining area is covered with indigenous trees, plants and grasses left wild. Fencing is made from natural materials including lantana to avoid injury to animals. Read case study.

The extensively restored landscape at Evolve Back Kabini includes a water body and a 2.5-acre butterfly garden.

Pench Tree Lodge has created earthen dams in the property to collect rainwater to help recharge groundwater levels. See further examples of rainwater harvesting in Water Conservation and Treatment profile.

Numerous lodges allocate space for growing vegetables to reduce their carbon footprint. Pictured here the organic farm and garden at Tiger Tops Tharu Lodge.

Natural pathways allow water to percolate back into the ground to recharge water level, avoid the carbon footprint of materials such as concrete and add to the ambience of being in nature. Picture here, natural pathway at Banjaar Tola - Taj Safaris.

See also Energy, Water, Waste and Cultural Heritage profiles.
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Evolve Back Kabini, Nagarhole
Sensitive Architecture Set Within Verdant, Restored Landscape

The design and construction of Evolve Back Kabini, part of Orange County Resorts & Hotels, is rooted in the parent company’s policy of conserving natural and cultural heritage whilst providing a high standard of accommodation for guests. Buildings occupy only about 12% of the sixteen acre plot adjacent to the river Kabini which runs through Nagarhole National Park. The rest has been transformed by planting indigenous trees and shrubs and creating a waterbody benefitting wildlife and harvesting rains to recharge ground water.

Resort buildings and guest huts are built to reflect the architecture of the local Kadu Kuruba tribe. Trees planted around buildings provide natural cooling. The use of local thatch renewed each year enables buildings to blend into the landscape.

Interiors are designed to exploit natural ventilation and light to minimise energy use. Rustic furniture has been created out of waste wood.

The infrastructure includes recycling facilities, solar power for hot water, cluster based monitoring for electricity, a 100 KLD sewage treatment plant enabling water to be reused for irrigation, and a swimming pool filtration unit for water recycling. Off-site wind farms run by the Resort’s parent company, put back more energy than their resorts consume. (See Water, Energy and Waste sections for more information).
Tiger Tops Tharu Lodge, Chitwan, Nepal
Keeping Traditional Tharu Architecture Alive

Tharu Lodge, built in 1980, is a celebration of traditional design emulating the longhouse style of Tharu architecture using local materials and labour. The core structure is local Sal timber with a tile roof. Walls are made with reeds, mud and dung which serve as a natural antiseptic to keep the bugs out. The traditional theme is carried through the interior design with traditional fabrics and local art.

The buildings occupy about 10% of the 25-acre site. The grounds have a substantial certified organic vegetable garden and dairy and a large elephant enclosure. The rest is covered with indigenous trees, shrubs and wild grasses.

Paths are natural to allow water to percolate back into the ground.

Solar power is harnessed for heating hot water. Black and grey water is treated in septic tanks. A small biogas unit produces biofuel for cooking drawing on cow dung from the lodge’s dairy and reducing the amount of LPG required.
Dhole’s Den, Bandipur
A Happy Marriage of Contemporary Architecture and Eco Design

Dhole’s Den is a shining example of a safari homestay built in a contemporary, minimalist style to high eco standards. The main building and guest accommodation with five spacious guest rooms has been designed to maximise natural light and ventilation with large windows and sliding glass doors giving panoramic views of the Nilgiri Hills. High ceilings combined with tree planting and wide eaves enable rooms to be kept cool without fans or air-conditioning. Local materials have been used where possible. Rooms incorporate traditional stonework, a technique which had been disappearing from the locality replaced by high carbon materials such as concrete. Ramps have been installed to accommodate guests with disabilities.

Large windows, sliding doors and wide eaves maximise the use of natural light and ventilation.

Interiors maximise natural light and ventilation. There is no air conditioning or fans.

High ceilings, tree planting and wide eaves keep rooms cool.

Local, traditional stonework, a design feature of interiors.
A 10 kwh micro wind and solar power hybrid generator produces sufficient power to meet all the lodge’s energy needs apart from the water pump. Separate decentralised rooftop solar panels have been installed for use in the kitchen bungalow and other areas. Guest rooms have a one-key system to turn off electricity.

The buildings occupy only about 5% of the site. The natural landscape has been retained and rejuvenated with indigenous shrubs, grass and trees. Rainwater is harvested from rooftops and captured in a water body. Natural pathways and the landscape allow rainwater to percolate back into the ground. Wastewater is treated with an eco-friendly sewage treatment plant using root zone technology and recycled for irrigation. Fixtures in the lodge include aerated taps and dual flush toilets to conserve water. A biogas unit using kitchen waste provides fuel for cooking.
Spice Village Thekkady, Periyar
A Multiple Award Winning Eco Resort

Spice Village, one of the oldest resorts in Thekkady near Periyar, is modelled on the native Manan tribe of the region. A pioneer in sensitive eco design, the lodge offers 52 spacious cottages set in a natural landscape with indigenous trees, plants and naturally grown wild grasses.

Buildings are thatched annually with local elephant grass using traditional skills and local labour. Wide eaves provide natural cooling; the cottages have no air conditioning. Furniture is made from upcycled pine cases sourced 25 years ago from the nearest ports. Floors are made of stone with natural coir mats.

A sewage treatment plant combined with an effluent treatment plant enable 45 kl of water to be recycled daily, 40% of their usage. The swimming pool has a water recycling unit. Aerated water taps combined with dual flush toilets help to conserve water further. The grounds have a rainwater harvesting system to enable ground water to be recharged during monsoon rains.

A 65 kw solar power plant has been installed making a substantial contribution to the resort’s energy consumption and reducing its carbon footprint. Water is heated through solar power. All guest rooms have a key one switch system to turn off electricity when guests exit their rooms. Lighting is LED, the most energy efficient, throughout the property. Guest refrigerators are CFC free. A biogas plant converts kitchen organic waste into methane for cooking.
An area is set aside for segregating waste.

A vermicomposting system with 78 tanks enables solid food waste to be recycled on site and turned into valuable organic manure for the resort’s two-acre grounds. The grounds include a certified organic kitchen garden.

Waste segregation facilities.

Vermi-composting operation to recycle food waste.

Certified organic kitchen garden.

Keeping the grounds clean and facilitating recycling.

Blending into the natural, wooded landscape.
Kanha Earth Lodge, Kanha
Award Winning Design Combined with Rustic Charm

Kanha Earth Lodge marries inspiring architecture and rustic charm with a concern for the environment. Buildings are constructed of locally sourced stone, mud plaster, terracotta tiles and rough-hewn sustainably sourced and recycled timber. Furniture is hand crafted from waste wood and railways sleepers which combined with the construction, earned the lodge the accolade of winning the All India Stone Architectural Awards in 2010-11.

The common area exploits the use of natural light and air. The twelve guest cottages are built using traditional techniques, materials and labour inspired by Gond tribal architecture. Buildings are located adjacent to trees to benefit from natural shading. Wide eaves in the local style combined with triple layered roofs to trap air provide natural cooling.

The sixteen-acre grounds, restored with indigenous trees and grasses, have been left natural helping to recharge groundwater levels during the rainy season with not a single tree lost during construction.

Pathways and water pipes have been designed to channel rainwater into a 25-feet deep well. Sand, pebbles and small stones are used for pathways instead of concrete, a carbon intensive material, to allow rainwater to percolate into the ground. Dual flush toilets, aerated taps and showerheads are in place to reduce water use.

Guest cottages reflect local Gond architecture and are constructed of local materials with local labour.

Interiors have large windows to maximise natural light and air. Ceilings are tripled lined for natural cooling.
Pench Tree Lodge, Pench
Providing a Low Impact Window on Nature

Pench Tree Lodge was built in an under-developed zone to support the conservation policy of not overcrowding an area and making it unsustainable. Construction was limited to 2% of the area. No trees were felled during construction. The landscape has been left natural and extensively restored with indigenous planting. Earthen dams have been created to harvest rainwater and recharge ground water.

The six tree houses are built out of local sal wood from sustainably sourced and recycled timber and give guests an immersive experience of nature. Rooms and bathrooms have been designed to maximise natural light and air with natural cooling provided by the trees. Rooms have a master switch to turn off all electricity. Bathrooms have aerated showers and taps. The interior design combines vintage furniture and natural materials.

To reduce the construction’s carbon footprint, eco architect Dean D’Cruz incorporated the existing water tower and foundations for a dining room inherited with the site into the design of the lounge and dining area. Large windows set within wooden framing reflecting the surrounding trees, provides an abundance of natural light.

Restored landscape.

Trees houses benefit from the natural cooling of trees.

Utilisation of an existing water tower and foundations

... to create a light and airy lounge and dining area.

Rainwater harvesting through the creation of earthen dams.
Barahi Jungle Lodge, Chitwan, Nepal
A Blend of Contemporary Elegance and Local Materials

Barahi Jungle Lodge, was built in 2013 adjacent to the river Rapti on a 30 acre site which has been restored from overgrazed farmland to wildlife-friendly habitat. Over 5,000 trees, elephant grass and more than 130 species of native flora planted in the grounds attract a myriad of birds with a family of jackals and a rhino amongst other species who have also taken up residence. The 36 cottages and reception areas are built to blend into the surroundings and occupy only approximately 4% of the site. One of the cottages is set aside for disabled visitors.

Buildings were constructed with extensive use of local materials including thatch, wood, bamboo, locally handmade clay bricks, mud and stone using local labour. Interiors blend contemporary and traditional design and furnishings using local textiles and natural materials such as bamboo.

Large windows opening out onto guest room balconies shaded by well insulated thatched roofs maximise the use of natural light and ventilation. LED lights are used throughout the property. A one key system is used for all guest rooms to ensure energy is saved when guests leave the room. Water efficient fixtures including aerated water taps, low flow showerheads and dual flush toilets are used in guest rooms to conserve water.
A solar system was installed from the outset for heating hot water. A biogas unit utilises gas from biodegradable waste for cooking alongside LPG, a cleaner source of power than wood. The lodge has a reverse osmosis water filtration plant for cleaning water for drinking and cooking, positive for reducing plastic waste.

The lodge segregates its waste into biodegradable (green) and non-biodegradable (blue) waste with bins in the grounds for segregation and three separate storage rooms for waste segregation and disposal.

Renewable energy includes solar thermal for heating hot water.

Biogas unit producing fuel for cooking alongside LPG.

Grease trap skimming of oil and fat from the kitchen.

Dustbins in the grounds segregating rubbish.

Reception area and dining hall combine contemporary design with the use of local, natural materials.

Guest room for differently abled guests.

Wildlife viewing balcony outside the dining hall looking towards the river across natural landscape.
Reni Pani Jungle Lodge, Satpura
A Hidden Gem Concealed in the Forest

Built on 35 acres of degraded forest, Reni Pani is constructed using locally sourced materials to blend with the surrounding regenerated forest. Existing trees on the site were retained. A further 2,500 indigenous saplings planted since 2009 have restored the site to a thriving forest and habitat for wildlife including breeding sloth bears, leopards, wild boar, porcupine, rusty spotted cat, jungle cat, palm and Indian civets, sambar deer, resident herd of spotted deer and numerous bird species.

Twelve cottages in three distinct styles - nallah, forest and hill units - and luxury tents are designed with viewing decks to provide a magical experience of the wild. Buildings incorporate mud and dung plaster and local tiles to reflect local architecture. Ceilings are lined with bamboo chatai, a sustainable material. Furniture, room fixtures and lights are made from recycled and refurbished material.

Traditional wall paintings made by local women using natural paints and extensive use of local Gond art reflect local culture. Dustbins are made by local weavers. Pathways are made with sawdust avoiding the use of cement. Aerated taps and flow flow showerheads and dual flushing toilets help to minimise water use. Solar power is used to heat water in staff accommodation. The use of LED bulbs is maximised to save energy.
Red Earth Kabini, Nagarhole
Low Carbon Impact Using a Traditional Rammed Earth Technique

All buildings at Red Earth Kabini are constructed using a traditional rammed earth technique with minimal usage of steel or cement. The construction was undertaken with the assistance of Professor Yogannand of the Indian Institute of Science in Bangalore. Soil for the construction was excavated from the site and the holes converted into two water bodies now teeming with endemic fish. No plastic or cement lining was used and instead the lake bottom is lined with clay from local tanks. The lakes were sited adjacent to sloping ground to maximise water from rainwater harvesting.

Roofing is made of elephant grass, with no concrete shell, enabling the cottages to keep cool at all times. Buildings are painted naturally with the mud used for construction. The flooring is a combination of terracotta tiles and handmade glass tiles from Karaikudi in Tamil Nadu. Furniture is antique and sourced from different parts of the country to reduce the requirement to cut trees. One of the twenty guest cottages is equipped for physically challenged visitors.

All hot water is provided by solar heating. Dual flush toilets, aerated taps and low flow showerheads in guest rooms help to minimise water consumption. Wastewater is treated by a sewage treatment plant and recycled for irrigation using drip lines.

LED and CFL lights are used throughout the property. Star rated air conditioning with invertors is a further positive step for energy conservation along with key tags for guest rooms which switch off power within one minute after the key is removed. Construction was undertaken in compliance with regulations - sanctions from the DCs office, pollution control board, town planning, and the Tourism Ministry and in consultation with local communities through the Gram Panchayat.
The Teak House, a building for outdoor dining and showing wildlife documentaries at Svasara Resorts, harnesses the wind for natural air conditioning, modelling its construction on the garden pavilions popularised by the Maratha kings of yore. The building is orientated NW-SW to catch the predominant SW wind and to keep the summer sun out while allowing the winter sun in. Deep roof overhangs provide shade.

To keep the carbon footprint low, the construction used locally available stone and recycled teak and white Allahabad roof tiles from old, dismantled buildings. A strategically placed central post and hip ridges at the two ends have replaced trusses traditionally used resulting in a high and airy roof. Walls are finished with broom plaster.
Working with nature –
reedbed filtration for cleaning kitchen greywater
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