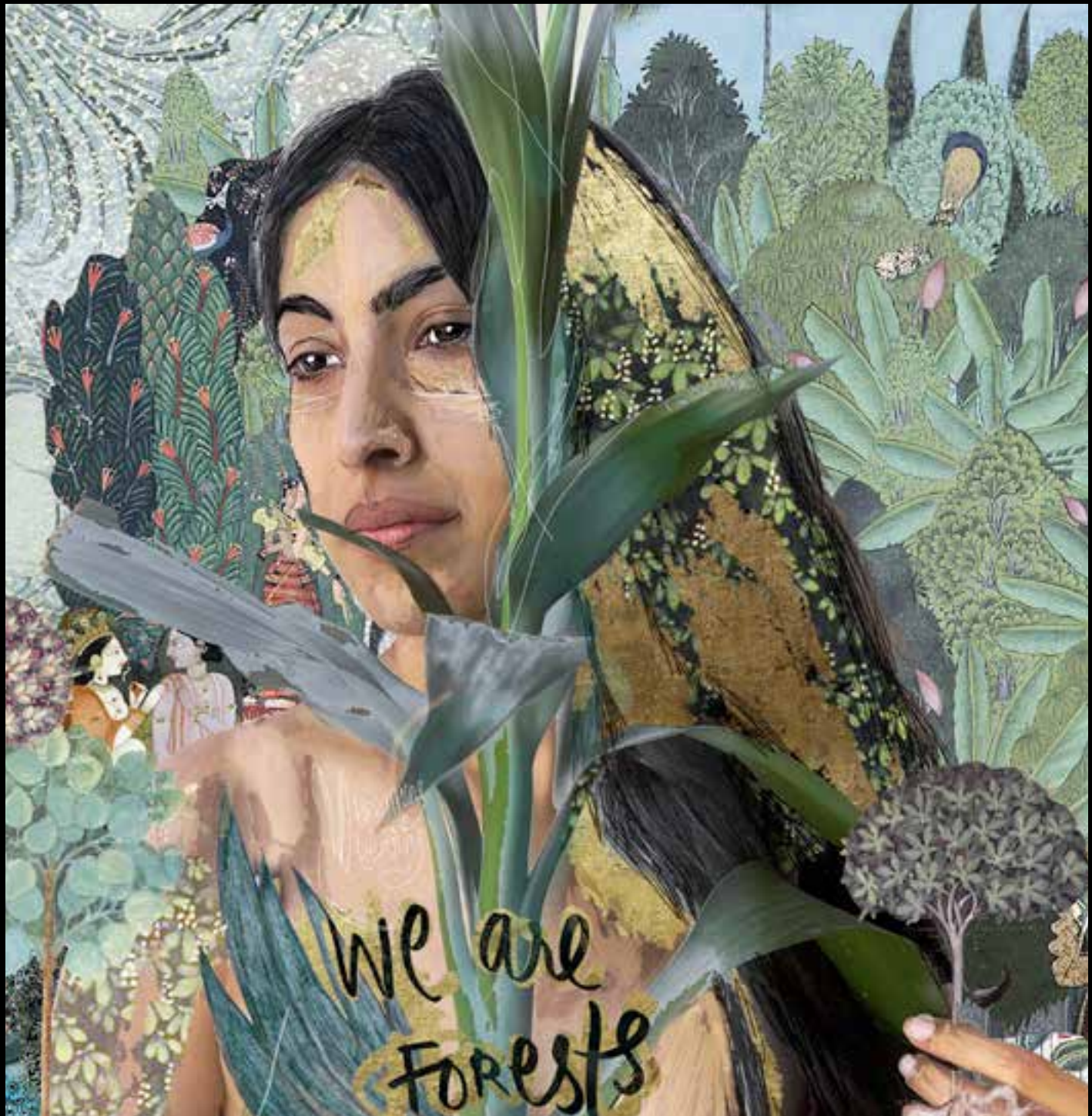




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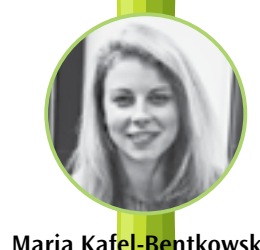
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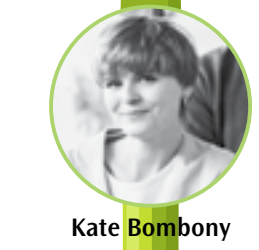
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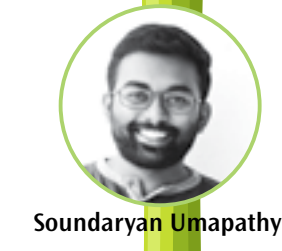
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### Is it really over ?

this strange *annus horribilis* that went by the innocuous number 2020. Everybody agrees that we cannot be the same person stepping out of 2020 as we were blithely stepping into it. The learnings ranged from 'never wearing tight jeans again' to 'climate change is real'. One of the bigger issues thrown into relief is the work of architects who plan buildings and spaces, as if Earth matters, (with apologies to Schumacher); those who have said no to the bright and shiny, eschewed Satuvorio for compressed earth, and truly walk the talk of sustainability.

Discussing this with Ar. B V Doshi, he said he felt hypocritical writing on sustainability while the poor were dying as they walked back to their rural homes; that there was no point in people like us, or glossy, stylish magazines like IFJ writing about it. He said sustainability in its barest form, was human sustenance and human life, suggesting that I look at a whole different slew of work. As always after a conversation with the only person I call Guruji, it gave me pause. I then struck off those LEEDS-box-ticking projects on my list, and followed his advice, focusing on people who were living exemplars of sustainability at work, some quite unsung.

This then is our big edition of the year, on a single topic of importance. We have covered the high-tech and the vernacular; not seeing a dichotomy but rather appreciating technology as the driver of a new a tech-rich model of sustainability.

Now that we're done with 2020 there is a faint flicker of hope that 2021 will be the year of redemption. That all those plans will finally fructify and that we will bring the learnings of this terrible year with us, to the table of dreams.

After the learning of the year and re-wiring our brains, that flicker of hope speaks to a relearning of old values. A re-thinking of what's acceptable. A re-definition of normal. And that now sung-out phrase: the new normal. At the end of our time, we will have understood whether or not we did learn lessons of value or whether we went back to the bad old ways. But I did say 'hope' did I not ?

Your friends at IFJ wish you the realization of those hopes, dreams and plans in the year ahead. Good wishes for the new year!

*Ashia Khan*

I look forward to hearing from you.  
Please send your thoughts to me at [edit@ifj.co.in](mailto:edit@ifj.co.in)



# ON SUSTAINABILITY: ARCHITECTURE & PRACTICE

A Perspective by Dean D'Cruz

architect dean d'cruz, co-founder and principal architect of mozaic, writes about his readings and learnings from a three-decade long tryst with the landscape of goa.



**It has been 32 years** since I came to Goa. In the beginning, I worked for Gerard D'Cunha and in time entered into a partnership with him which was called Natural Architecture. Gerard had worked closely with Laurie Baker who was always very hands-on, maintained a down-to-earth approach to architecture where one actually builds oneself! So, it was a very interesting learning this integration of technology and the Baker-approach to architecture. As I grew, I was influenced more by the humanistic approach to architecture rather than the final sculptural form.

Initially the practice was experimental. Back in the day, the word sustainable was not yet in the 'architectural dictionary' and it was really just about being direct in your approach. I realise now that maybe that mindset resulted in such simple design solutions. Influenced by Baker's principles, for years now we have tried to maintain an approach which is direct, simple and low-cost. When people talk about sustainability, one immediately thinks of technology, and new materials. But I think it is more about the simplest way to keep things low cost. A mix of these approaches was our way of perceiving good design.

Mozaic came up much later into the practice in partnership with Reboni Saha who is a product designer from NID, Ahmedabad. As a collaboration between an architect and a designer, we would look at the broader aspect of how interdisciplinary practices could offer holistic solutions. We believe that all design disciplines have a common thread and that is how we decided to name the practice 'Mozaic' - a

collection of different pieces in a design puzzle that we could bring together in some form. Our expertise here is to offer a comprehensive solution.

Initially our projects mainly composed of low-cost houses which we developed primarily through learnings from the building construction process, the understanding of materials, costing, reaction and longevity. Once we developed this skill, we were offered hospitality projects-small and big, jungle resorts, institutional work, and some commercial work. Every few years we evolved our process, and tried to push our boundaries to avoid getting stuck in a particular style. We consciously tried to avoid our architecture from being labelled as a 'Mozaic building' or 'Dean Cruz's building'.

For me context is not necessarily responding to the building next door but responding to the needs. It does not necessarily have to be local in terms of a visual language. It is important to me that the building is fluid without being functionally fixed, but to see how it can morph over time. As I mentioned, the most basic form of sustainability is about how little it costs and the connect with the local environment. The fact that Goa is among the rich biodiverse spots in the world, one does feel the need to connect with the outdoors and create buildings that are as transparent as possible. In our practice we strive to keep this in mind.

Influenced by Baker, our initial architecture was fairly opaque I would say. The difference is Baker worked with brick, but being based

out of Goa laterite seemed like a more sensible choice to use for us. While laterite lends a touch of solemnity to the building, we felt over time the need to introduce more transparency in our buildings. Slowly we moved towards a pavilion-style of architecture that rendered a much greater connect with nature, allowed ample air flow resulting in a more appropriate climatic response. Most of the traditional architecture that one sees in Goa often does not perform well climatically. I feel like a hybrid response to some of the characteristic features of traditional architecture is critical in creating a space that is climatically sound. I think it is very important to assess one's building post-occupancy and see how much of what we have tried has actually paid off. This is a practice we follow at our studio where ten-years post-construction we visit the buildings to learn for ourselves. These learnings I feel are very critical and can influence future works.

A lot of the built forms that we see today are eyesores, like blots on the landscape. So it is important that architecturally we understand what enhances nature and how it can be incorporated into our built world. Till that time, we can at least let nature take over these buildings in some form.

Every time I look at architecture, especially while working on the regional plan, trying to understand peoples' perspective on development- I have realized that the problem most people have with so-called development of buildings is visual clutter. The moment we see development, we see degradation of the environment, and it does not have to be that way. If we are sensitive to what a building needs to be, and how it connects with the outside, the resentment towards development will reduce.

There is a famous Australian architect who said, "Buildings don't interest me anymore, people do," and I think it is extremely important for every architect to realise this eventually. Architecture is about creating a safe haven for people to interact in. At the end of the day, your building is just a backdrop for human interaction. Very often we look at a house in isolation while in a larger context it is actually a conglomeration of houses

that need to respond to each other. You can see this happening in local Goan villages- the little streets with people in the 'balcao' in front, the chapel forming a focal point for the village to gather- there is a traditional response. In the last 15-20 years of being involved with the Goa Foundation, Goa Bachao Abhiyan, Goa Heritage Action Group, and being a part of lot of social forums has made me even more sensitive to peoples' issues. I look at architecture not as isolated buildings but as community efforts.

We need to change this paradigm of what is good architecture from being visual to effective.

While designing a community centre in Nerul, essentially a hall used for community functions and get-togethers, atop a hill with beautiful panoramic views, the question we asked was, can a community centre be more than that? How can one



keep it alive throughout the day? What are the various activities one likes to get engaged in and what is missing presently? With a school nearby, we decided to integrate play spaces which most community centres do not offer. In this manner, we began creating a brief based on what we sensed the community needed. We are now looking at every village having their own community centre which they can use for cultural, recreational or informal gatherings- with the core idea being to get people together effecting social change through architecture.

It is time for architects with substantial experience to give back their learnings in some way because there is a real drop in the standard of education. Professional

practices need to step in and maybe accommodate a longer internship period wherein part learning (skill) happens in the college and part of the learning (implementation) is hands-on in good offices. It is an extremely superficial approach to architecture that we see today with the speed of execution demanded. That said, the youth are energetic and have great potential in their hands- with new tools of software for design, prototyping and assessing knowledge from around the world. These are great assets that we did not have, but must be used carefully.

While specialised architecture is reaching new levels of proficiency, there are still possibilities of a fresh interpretation and the idea of brainstorming on bigger platforms, where architects meet and discuss projects is essential. One such collective called the Gubbi Group, where the 20 of us are trying to work in the area of sustainability, and have



# SUSTAINABILITY

Ar. Neelam Manjunath

sustainability is the most widely used word in today's world. it has suddenly become the most important word across professions ,be it marketing, building professionals, advocacy, policy and so on; everything must be labeled sustainable to make it credible!

## What is Sustainability after all ?

There are several definitions given by different experts and scientists from time to time. The earliest one being given by Carl Von Carlowitz in 1731, defines sustainability as “ the ecologically and economically meaningful handling of natural resources.” (Sylviculture Oeconomica)

As per Oxford languages, it is “the ability to be maintained at a certain rate or level” . For example, judicious usage of natural resources in order to maintain ecological balance.

In today's time, it refers generally to the capacity of the biosphere and humans to co-exist. In other words, it is a state in which development, usage of resources, investments, technologies, etc and society are in balance both in current times and in the future. Development is considered inherently unsustainable. Hence for clarity sustainability is defined through the interconnected domains of ecological prudence, economic development and social justice.

## the awakening

There is a strong realization that modern industrialization which advocated that “Scientific knowledge is technological power over nature” has been leading us up the garden path to polluted air, water, overcrowded and diseased slums etc - an unsustainable and disastrous consequence. And a new realization that “Nature is the highest order of science and technology and man is merely a strand in it”, is dawning

over the human race. Man has now understood that he cannot control nature. If he has to live healthily and meaningfully, he should once again learn to live in harmony with nature and the nature's laws.

- This submission to the **‘Power of Nature’** is bringing humility to people and an understanding that Nature is way more powerful than them .
- **Sustainability without Spirituality** is like a contradiction in terms. Living in a sustainable manner definitely helps spiritual growth. It also explains why the environment has been a religious issue since time immemorial. Sustainability – a scientific solution to the global warming issue is based on deep spiritual and religious experience. When Development is consistent with spiritual traditions we can talk about a paradigm shift: from the perspective of our relationship to one another, to future generations and to the web of life of which we are merely a strand. And we will then be able to realise the concept of **“Brotherhood of man” – a true global civilisation !**
- Slowly, development agencies and economists are also recognizing that development is a process that has to encompass both the spiritual and material aspects of life; that personal transformation has to go hand in hand with social change. The New Development paradigm must therefore be holistic and consistent with the spiritual traditions of the people.



## sustainable communities

Sustainable communities are being developed across the world along the lines of environment friendly technologies where:

1. people are learning to say 'NO' to excessive and wasteful use of energy, commodities etc.,
2. They are learning the three R'S – Reduce, Reuse and Recycle
3. They are turning towards alternative medicines like Ayurveda, Homeopathy, TM etc., which are based on the principle that everything in nature is in equilibrium, including man. And hence any disease is merely a disconnection of intelligence from its source or wholeness.
4. Organic faming, vermiculture composting, waste water recycling, rain water harvesting etc., are some of the nature friendly technologies being used in these communities. ( fig.1)
5. The best result of this drive for sustainability is the realization by the people that they cannot do anything alone. They cannot solve their problems alone – “Man is a social animal” – a definition long forgotten is being realized with full force by everybody across the world. So, people are coming together, taking responsibilities and actions together, towards common goals of the community – resulting in better community life.



Fig.2 : Logo of CGBMT, Centre for Green Building Materials and Technology, Bangalore depicting man within nature.

## the three s's

Sustainability, Simplicity and Spirituality in my opinion are synonyms. A simple way of living , by which we are able to fulfil our basic needs to live a safe and healthy life is sustainable by default. And in living a simple life , the basic principle is to accept the equity of available resources for every human and non-humans on this earth to live a reasonable life. And this is spirituality in real terms which translates to brotherhood of man.

Sustainable practices that were at the core of vernacular living, increasingly provide inspiration for environmentally and socially sustainable contemporary techniques. It is happening, but the numbers are too low to make the transformational change required right now !

We often hear the phrase Man and Nature which is actually a misrepresentation. Man is a part of Nature, is in the realm of Nature. Nature is the whole of the physical world. The most intimate part of Nature in relation to man is the biosphere, the envelope embracing the earth, its soil and everything that is alive. Humans are Nature. We are the personification of Nature. Nature can survive without us, but humans cannot survive without Nature. We are just another species that has caused a disproportionate impact on it. Our CGBMT logo ( fig.2 ) symbolizes the idea of “man within Nature”; man inextricably tied to it and a result of it. With our fully developed mental, physical and spiritual faculties, it is our duty to live in harmony with Mother Nature!

And this starts by accepting our connection and realizing the importance of our ties- That would be being truly Sustainable!

In the words of of Chief of Seattle “*All things are connected like the blood that unites us all. Man did not weave the web of life, he is merely a strand in it. Whatever he does to the web, he does to himself.*” if

Fig.1: Community agriculture practiced at Dayalbagh, Agra, paddy planting





# SUSTAINABILITY IN THE INDIAN CONTEXT

Ar. Suhasini Ayer

## The Sustainable Development Goals (SDGs)

or Global Goals, were adopted by all United Nations member states in 2015 and India as one of the 193 countries has signed and committed to implement policies, programs and projects that will address issues that lead to inequity and poverty, to protect the planet while ensuring that all people enjoy peace and prosperity by 2030. As per the 2017 rating, India ranked 115th and in 2020, we ranked 117th, so we are not really progressing in the right direction, one would say.

One of the primary challenges to development in India, sustainable or not, is the gap between the available natural resources and the demand that development places on it. According to Mr. Prahlad Shekhawat (Director Alternative Development and Research Center, Jaipur) It has been estimated that India as of now (2015) demands the bio-capacity of 'two India's' to provide for its consumption and absorb its wastes, as quoted in the report released by Global Footprint Network and the Confederation of Indian Industry (CII). The main consumption and waste production is by the urban population and this is projected to grow from 377 million (census 2011) to at least 780 million by 2050, doubling itself even by the most conservative estimate.

In 1990, pre-reform, about 55% of urban India lived in slums or unauthorized settlements with no assured access to clean water, sanitation, land tenure, basic health care, education and housing. This proportion improved over the next 25 years and in 2014, as per the World Bank, only 24% of urban dwellers in India lived in slums or unauthorized settlements. But by 2018, this number rose, and we presently have 35% urban population residing in slums. How did we regress back to the levels of 2004? Post reform, the Indian economy is supposed to bring development and overall prosperity to all its citizens, so how do we account for this ever-increasing economic and social disparity? By 2017, 10% of the Indian population was holding 77% of the national wealth while basic education and health care continues to remain a luxury for over 50% of the Indian population, rural and urban.

The urban sustainability index (USI) is a measure of equally weighted average of six categories – air quality, built environment, sewage & sanitation, solid waste, roads and water quality & supply. With the impact of extreme weather on agricultural productivity due to climate change, the flow



of distressed migrants to urban areas is inevitable. How will more LEED or TeriGriha rated building offset the impact of ever-growing slums on the urban sustainability index? The pandemic caused by the novel coronavirus called Covid 19, has laid bare the dependence of the construction industry on migrant labor. As the number and extent of the unauthorized settlement grows, they occupy low lying areas and wetlands, along main vehicular arteries and peri-urban zones impacting water, food and mobility.

Be that as it may, why should we planners, architects and designers be concerned with this growing disparity? Is this not an essay on Sustainability in India as it pertains to the design fraternity? Anecdotally it is often said that in India, architects and designers service a client base that comprises the 1% of the urban population who not only have access to land and financing but also have a desire for design. So essentially our range of influence and reach to plan and design sustainably is limited to the 1% who are contribute to the problem of disparity. Be it houses or integrated townships, planning and design decisions are not usually made within the framework of the approved

concept or evidence-based analysis, to be brutally honest it is the murky combination of power structure and cost of money that controls decision making.

In May-June 2019 the titled architects in UK in an open letter to all practicing architects in UK called for a commitment to sustainability with clear action points with defined goals and timeline. Together with the property market, developers and government they are working to enforce regulatory mechanisms to meet these goals. Would the entitled and established architects and designers of India be able to come together and initiate such an action? To realistically evaluate if this is possible, it is essential to see how the profession is valued by the lay public and the patrons. Most educated Indians still do not distinguish between an engineer, contractor and an architect as design is nondifferentiated from style or fashion, thus imitation is sufficient to fill the niche of aesthetic expression in buildings. And among the 1% who do engage architects, the value attached to the input is minimal, which is why Indian architects have one of the lowest commission rates globally and

most clients play fast and loose with the commitment to the agreed fee payment amount or schedule.

This situation puts a strain on most practices between capacity to deliver quality against number of commissions required to ensure economic survival of the practice, leading to chronic mistrust among the architects and designers and crippling cross-disciplinary collaboration.

Given the context, scale and urgency, meeting the national commitment to sustainable development goals will require multi-pronged action, which cannot be distilled into a set of recipes of how to build net-zero projects using earth and bamboo, though these are important too. The remedial action will need a partnership between successful professionals – academia – public to engage in urban planning and building regulations to invite participation to empower people to take informed decisions to reduce inequity, economic and social. Only with equitable and inclusive development, we can address the issues of climate change and sustainable human settlements; rural or urban. if





# A JOURNEY OF PASSION FOR SUSTAINABLE BUILDING

Ar. Girish Doshi

## Girish Doshi speaks of his path,

I was born on 27th August 1958 in Madras, now Chennai, just about 11 years after Indian independence. I grew up in a young country, in a regular urban middle class milieu, a young lad brought up in a joint Gujarati Baniya Family in Rasta Peth, a traditionally cosmopolitan area of old Pune. Gunjan Housing was a place where 12 Gujarati families lived, shared and celebrated their lives together. This is the place which nurtured my strong sense of collective living. My mother who we all called Ma, was the leader of our neighbourhood and she cared a lot for the wellbeing of everyone by regularly preparing treats for the entire community, celebrating festivals together and also sharing their sorrows, always together. I was her assistant in all her endeavours to keep the neighbourhood together. Ma was responsible for sowing this seed of collective harmony and empathy in me. The surrounding Peth areas and adjoining Raste Wada became my extended playground and helped me build a strong sense of community celebration.



While growing up in Gunjan housing, our neighbour, Manorama ben, was one of the first persons who cared for me besides my immediate family. She was a staunch Gandhian and an expat from East Africa who directed me towards architectural studies. So after my final year of school, I went to study architecture in Abhinav Kala Mahavidyalaya, the only architecture school in Pune in the early 1970s.

In 1973, in my first year of architecture studies, my small community of Rasta Peth expanded. We were girls and boys from diverse backgrounds, urban and rural mix, traditional old city middle class mixed with the new convent-educated group. Senior professors like Architect Palshikar helped keep our morale high. I enjoyed my first year so much that I failed the year! This resulted in working part time with Architect H.M. Kadam in the morning

and afternoons in the college library. I discovered the works and writings of Le Corbusier, learned about light, space and the concept of abstraction in architecture. This one year exposed me to practical skills, professional behaviour and the master architect.

I entered the second year of architecture with new energy and enthusiasm. Padhye sir, our history professor introduced me to architecturally diverse places like Chandigarh, Delhi and Fatehpur Sikri. During my final year of architecture I visited CEPT Ahmedabad for a NASA convention, we were introduced to an enigmatic personality with long hair, wearing a purple kurta. That first glimpse of Doshi is carved deep in my mind; I decided to work with him. My inquisitiveness made me visit Sangath, then under construction. It changed my perspective and began a new era of my life.

Two years of persistent hard work led to my being noticed by Doshi, thus began the *Guru-Shishya*, relationship that is intact to date, over forty years.

My years in Ahmedabad exposed me to a larger community of people. The presence of Doshi in the studio electrified the ambiance of Sangath. My discussions with Doshi on scale, space, light and life in general concluded in a passion for architecture, a feeling of enlightenment, everlasting curiosity and zest for space/placemaking laid the foundation of my architectural practice. For the first five years I was a bachelor, then a husband and then a father. The evolution from being trainee architect to project architect was happening at Sangath and at the same time a responsible family man was evolving.

On Doshi's 61st birthday on 26th August 1987 I had a farewell lunch with his family and boarded the evening bus to Pune. The next day on my birthday, I initiated my studio Navkar.

When I was leaving Sangath, Doshi was apprehensive about how I, a young father, would take care of my family on my return to Pune. So as a concerned Guru, he made me Clerk of Works on his project YASHDA. This work proved to be a cushion to financially sustain myself and my family from day one.

During my days at Sangath, Doshi introduced me to engineer Vishnu Joshi. He was the principal structural engineer with Stein, Doshi and Bhalla at Delhi and was a pioneer of ferrocement technology in India. I learnt how to build with fewer resources, and the use of economically sustainable technologies from him, whom I consider my Guru. I assisted him in a rural workshop for construction at Pen in Maharashtra which was the turning point for my design and build practice.

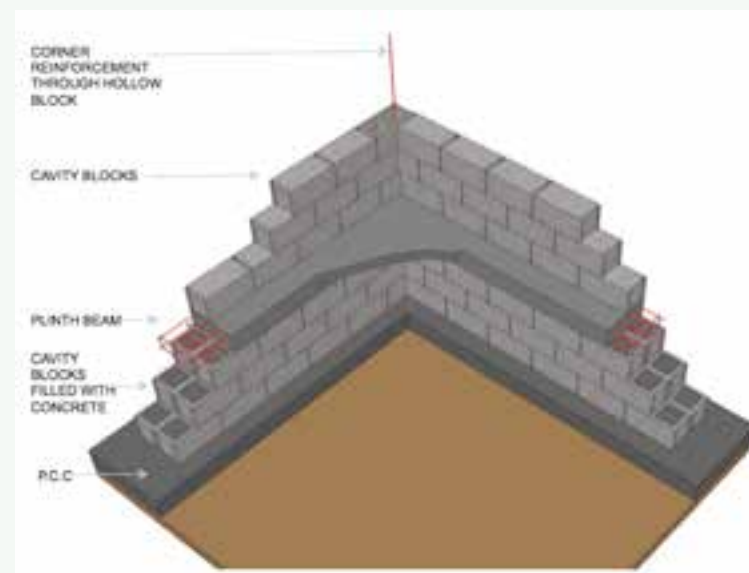
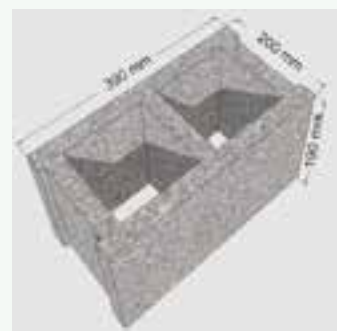
Vishnu Joshi invented a method of load-bearing construction method using a modular hollow concrete block with 'Ferrogamy' (Ferrocement-Origami), which reduces the cost of construction by 25% and possesses great ease of execution. It was called *Vishnu Padhhat*. He was an exceptional structural engineer and headed the structural division of Stein's office in Delhi for 40 years. Despite working in a big city, he always dreamt of working in a small village and finally started working with the Adivasis in the late '70s at Pen, a small village in Maharashtra where he built a ferrocement house and a workshop for himself.

Vishnu Padhhat originated as a building technique for Arunodhay, apartments around a courtyard and uses concrete cavity and hollow blocks as a primary material, in units of 200X400X200(h). These blocks together act as load bearing walls while the corners are further strengthened using steel bars as reinforcement thus forming a composite structure which is earthquake resistant. The footings and filler slabs using concrete blocks are also built using the same technique.

Having flat filler slabs help achieve full-height doors and the possibility of having old school-type ventilators helps cross ventilation. The cavity within the block wall helps reduce the interior temperature. Block wall is easy to build, and since the joints are less it is easy for masons to achieve plumb. Further we fill the external joints of the wall and with lime punning inside, thus saving the cost of plastering the entire house. The terrace slab is 200 mm thick with 150 mm thick concrete filler blocks thus keeping the inside comfortable. In our observation there is a twenty percent savings in concrete and the steel required for one square meter is nine kg which is much less than required for a conventional framed structure. The block making machine is cost effective and while making blocks on site it does not require electricity hence it is very easy to use in remote areas.

Whatever was designed in studio always evolved during construction. An organic way of design thinking, followed by pragmatic processes in construction, with the final solution materialised during site visits. I trained four builders who became assets to execute *Vishnu Padhhat*. The houses made using this method are standing the course of time, with space and placemaking.

I am fascinated by new things; almost child-like curiosity attracts me to people from varied fields and backgrounds from Doshi, Vishnu Joshi, my friend Ajit Rao and my collaborator Prasanna Morey; these people are my inspirations. if





# THE GARDEN SHOP, MIYABI

commission : narasha aggarwal creative living, mumbai

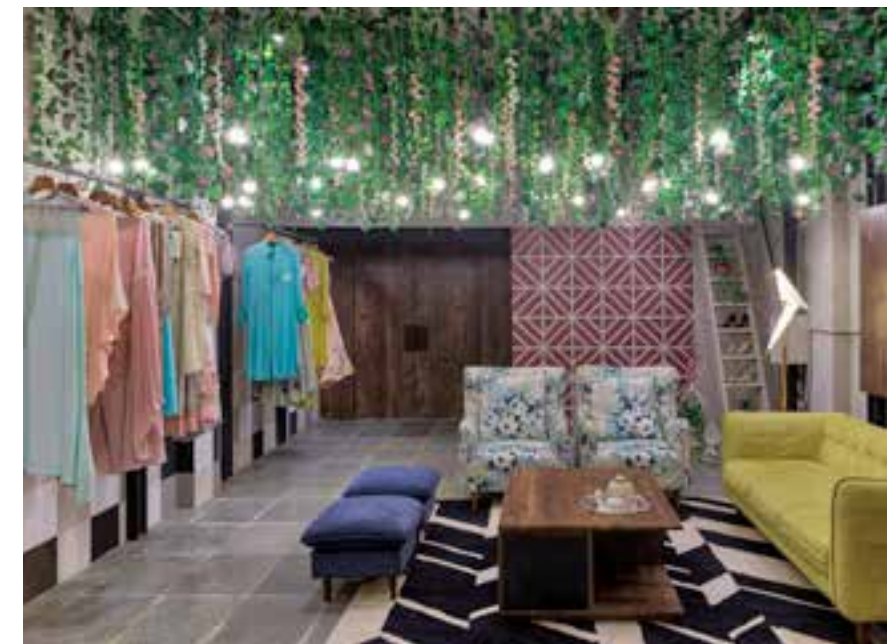
**Spread over 750 sq. ft.,** Miyabi (meaning 'elegance' in Japanese) is a wedding fashion store converted from an abandoned space in an industrial estate. The site was redesigned as a vibrant, leisurely and comfortable retail experience that allowed clients to browse and plan their looks while sipping on coffee.



Stripped down to its bare minimum, the 'I' beam trusses originally constructed to support the mezzanine were extruded in height to create the frame for a pergola. They were then embellished with artificial creepers and hanging lights to create an aesthetic mood.

An open layout allows the user free movement, and the verandah is divided into two spaces by a wall-to-wall, full-height chequered partition with a mirror. Embroidery patches are used to create a dynamic artwork symbolizing changing trends. Apart from a central seating area and a private study, the trial rooms are made of fabric as it offers flexibility and can be integrated into the studio when needed.

Earthy colors with Kota stone flooring and stone-textured repainted plastered walls were used for the décor, with metal display racks and partitions. A ladder was repurposed as a prop stand and vanity corner. Minimal wooden-finished furniture in bold colors with cage lights and bird floor lamps add an outdoor aesthetic to the space. ifj



BEFORE





# TAOCANG ART CENTRE

jiaxing

commission : roarc renew, china



## Spread over 2448 sq. m.,

the project is built from two granaries surrounded by the TaoCang canal and lotus marshes. Built in the 1960s, the granaries were once used by residents to store grains while the lotus marsh and pond were used for firefighting purposes. The western granary was conceived as a commercial gallery while the eastern granary was meant to be an art gallery.



The main galleries have four entrances with newly-added corridors, where visitors can move from either side to the center through freight entrances. Running east and west, the main granaries create an energy field; the horizontal form fits into the parallel nature of the old granaries while the ascending trajectory in the vertical form leads to the sky.

A wheat-ear pattern is formed by combining red bricks, reminding one of its monument-like structure. The undulating brick pattern drains the rainwater out, while concrete arches support the bricks ending with a double-curved effect. if





# MUSE, RIVERSIDE HOUSE salford

commission : spaceinvader design ltd., manchester

**The Riverside House,** built in the 1860s, is a Grade II-listed building adjacent to an old railway goods yard and alongside the River Irwell. Abandoned for several years, it was redeveloped into an award-winning workplace. The heavily-damaged main building structure and the brick façade were to be retained while constructing a four-story office that fosters collaboration. Sustainability and waste reduction were major aims concerning water and nature with biophilia and outdoor decking.



Following an agile layout, desks can be cleared at the end of the workday, and belongings stored in a locker. Natural elements such as water and wildlife, particularly kingfishers, inspired the color scheme. The firm further inspected the various strata of the sandstone riverbed to create a horizontal layering of tones of red combined with industrial textures for a sophisticated finish.

Beams and lighting units were moved to suit the meeting room layout and floor grilles were moved to suit desk layouts minimizing cost, disruption and waste. The wall linings were uplifted in some locations; a slatted timber finish is created for the perimeter walls to open up the floor plate, while arched window linings frame the views out towards Salford.

The zones that captured the best views were reserved for active areas on the second and third floors, such as shared desk spaces, a project room and a staff kitchen. Noise, lighting, circulation and toilets met BCO (British Council of Office) standards – an acoustic consultant was brought to ensure the appropriate amount of acoustic finishes to control noise. Upholstered seating, full-height booth seating and acoustic wall treatments were designed using durable materials along with base build finishes.

On the second floor, project and communal spaces flank the edges with openable partitions that allow engagement. Movable furniture and partitions support wider working practices, maximize natural daylight and views. Ancillary support functions are placed close

to the core, whilst ease of use and connectivity are prioritized in the joinery and loose furniture pieces. Aesthetically, it represents the formation of clouds with fully-controllable LED luminaires that enable the ceiling to complement or contrast with the external environment and a wide, outward swinging door allows connectivity to the terrace.

Living planters come with air-purifying and pollution-reducing qualities, along with promoting employee productivity. Eight stand-up desks and a stand-up desk in the project space allows colleagues to stand or move around while working. A feature 'wave' ceiling, part of a commission, in the client lounge is created by independent Manchester-based artists. A local photographer celebrates the space with location-specific photographic artwork, displayed in the meeting around a 'Manchester Pub' theme.





# A CHANGE FOR THE BETTER

sustainability finally gets the green light from architects via the use of eco-friendly materials, environment-friendly designs and a carbon-neutral approach

**At a time when concepts** like 'climate change', the Paris Agreement and the 'New Green Deal' command global attention, it seems that the idea of sustainability, especially when it comes to architecture, is dominating the conversation. There is very little doubt among architects that they must now factor in sustainability when it comes to approaching, designing and executing a project.

Indeed, some have even made it their life's work to develop this particular category of architecture, while others have progressively begun to adopt such changes in their work. Says Ar. Rahul Kadri, Partner and Principal Architect, IMK Architect, Mumbai, "Sustainability focuses on meeting the diverse needs of the present and future, while being sensitive to the environment and contributing to a high-quality life. As the name suggests, we follow the local context of the region with indigenous building materials, architectural language and climatic considerations.

We must cater to people of diverse age groups and social groups, providing for education facilities, social zones, relaxation spaces and entertainment options. It is important to have economic sustainability as well, for which we need adequate building entrepreneurship and financial facilities."

Ar. Kjetil Trædal, Founding Partner, Snohetta, Oslo, adds, "For a decade, we have researched and experimented with energy-positive structures that are net-carbon neutral over their life cycles. We focus on returning clean energy to society, offsetting the fossil energy and carbon dioxide footprint that otherwise exists in the energy grid."

Architects are now seeking to counter the drawbacks of conventional buildings and

structures. According to Ar. Mitu Mathur, Director, GMPA, New Delhi, "Buildings typically consume large amounts of materials and produce waste; sustainably-designed buildings reduce environmental impact through energy and resource efficiency by changing perceptions of what spaces should look like."

Ar. Amarnath Duleep, Founder and Director, Chronicles of Mud, Pune, gives us a simpler explanation, "There are several interpretations to sustainability; if we were to forego the jargon, it is the need to preserve our natural environment and ecosystem to protect our species over the generations. Both the personal and collective come together on this concern. Rapid urban development disregards the delicate ecological balance that binds together the ecosystems. Thus, a paradigm

shift in the architectural methodology ameliorates land, resource and wild degradation while creating energy-efficient spaces for human habitation."

Finally, sustainable design works in favor of everyone, from clients to countries meeting their emission targets to Planet Earth, Ar. Sachin Rastogi, Founding Director and Principal, Zed Labs, New Delhi, explains, "Sustainable design prioritizes energy-efficient strategies, minimizes negative impacts, promotes healthy living and improves building performance. It aims to meet present needs without compromising on future requirements, such as by minimizing waste and reducing dependence on non-renewable resources. We can blend together vernacular and modern technology to develop environmentally-compatible and economically-viable buildings."



photography :: ivan kvaal

powerhouse brattorkaia, norway | snohetta, oslo



vrindavan, sindhudurg | untag architecture and interiors, mumbai



photography :: vivek muthuramalingam

hornbill house, nilgiri | biome environmental solutions, bengaluru



photography :: joan guillamat

stone house,spain | nomo studio, spain



## sustainability: choice or necessity?

The architecture and design community devises strategies on how to minimize environmental impact with their projects, as they believe that it is their responsibility to do so. Ar. Anna Heringer, Founder, Studio Anna Heringer, Germany, says, “We must care for our resources and keep our planet safe for the coming generations, and it must be a series of everyday choices. It doesn’t have to be one epic decision; it could be something like, should we use environmentally-friendly paint and insulation material? Or, should we build large windows to bring in the sun and ventilation? Everything we do matters.”

Do extreme weather changes, a desperate need to save natural resources and the desire to be responsible customers result in a stronger push for sustainability? Ar. Rahul Kadri replies, “We have seen a rise in annual natural disasters all around the world, which has only increased the need for sustainable development. As per the Aon catastrophe report, titled ‘Global Catastrophe Recap: First Half of 2020’, there has been an increase of at least 27 per cent in natural disasters

recorded in the first half of 2020 as compared to the same period in 2019. Over the last 200 years, the world has witnessed an unprecedented migration of people from rural to urban areas. This ‘urban pull’ has created widening gaps between the growing city population and the physical and social infrastructure required to accommodate it – leading to a wastage of energy. Today, urban areas alone account for up to 70 percent of greenhouse gas emissions. There has been a massive shift in design strategies with an effort to develop ‘Green Building Concepts’, focusing on designing and maintaining sustainable buildings, minimizing the utilization of resources and prioritizing occupant well-being.”

Ar. Karl Johan Nyqvist and Ar. Alicia Casals San Miguel, Partners, Nomo Studio, Sweden, believe, “Companies have realized that they must have a green profile when pitching to new clients, which has pushed them into making a change. Secondly, many governments have already started with higher taxes on non-sustainable materials, waste and production – and it will be cheaper in the long run.”

house of silence, kalalgoda, sri lanka |  
damith premathilake architects, sri lanka



photography : ar. eresh weerasuriya

national institute of design, bhopal | gian p. mathur & associates pvt. ltd., new delhi



photography : : joe fletcher photography, drone promotions (aerial)

miner road house, california | faulkner architects and dzine concept, california

Ar. Chaitanya Padal, Ar. Kinnera Varma and Ar. Radha Neela, Founders, Studio Inscape, Hyderabad give a modern perspective on Indian sustainability. They say, “We believe in modern regionalism, which is contextual, traditional and modern. Sustainability comes naturally to Indians, such as reusing palm and coconut tree leaves, fruits, husk, bark and shell to be used in multiple ways.”

Ar. Mitu Mathur, says architects must move ahead with the ecological environment around us. “Climate change, global warming and depletion of natural resources are chronic problems in modern life. Therefore, buildings must be carbon neutral. To achieve this, buildings must follow high-performance efficiency standards and produce renewable energy to counter less helpful emissions.”

Speaking from an Indian perspective, architects Gauri Satam and Tejesh Patil, Founders, Untag Architects, Mumbai, say, “Our Indian cities, in the tropics, face issues in the urban heat due to excessive use of glass without shading – causing heat and glare and increased energy consumption, leading to a higher carbon footprint. A reduced forest cover worsens the situation as greenhouse emissions on the rise, thereby making our cities disaster-prone. On the other hand, vernacular architecture teaches us how to live within nature, be self-sufficient and minimize our carbon footprint.”

Taking a more customer-centric outlook, Ar. Amarnath Duleep says, “The environmental crisis is worsening every year, but ecological awareness has risen exponentially. Therefore,



jhopdi, pune | chronicles of mud, pune

there are consumer-conscious choices that vote for sustainable products and practices. Consequently, both eco-entrepreneurship and eco-consumerism are on the rise in the architecture and design field.”

Our traditional systems seem to have the answer: Ar. Sachin Rastogi says, “The country’s architecture has employed several designs for energy-efficiency, such as jaalis (latticed screens), chajjas (sloping eaves and canopies) and jharokhas (overhanging balconies), particularly in India’s northern regions these address the need for lighting and ventilation – while protecting occupants from the harsh sunlight. Aangans (courtyards) facilitate air circulation and light,

along with thick walls acting as thermal buffers for reducing heat gain.

We must design the size and orientation of the buildings accordingly, such as window-shading devices with effective wall-to-window ratios and fenestrations to maximize daylight. Using local materials, water bodies and natural vegetation counteract the heat-island effect. Rainwater harvesting strategies such as recycling and reusing water for cleaning and horticulture are a vital step towards water conservation. Organic and inorganic waste should be separated and PV panels installed on the roofs to fulfill hot water requirements.”

manav sadhana activity centre and creche, ahmedabad | footprints e.a.r.t.h, ahmedabad







studio shed, pune | studio alternatives, pune



auric hall, aurangabad | imk architects, mumbai

## what does it take?

Integrating green building concepts while planning a project can help achieve ‘net-zero designs’, which are energy-efficient and sustainable. Ar. Rahul Kadri agrees, “We must cut out materials that are not environment-friendly, which add to carbon emissions. Instead, our designs must include locally-available and natural materials, such as Compressed Earth Blocks (CEB). Buildings are designed to maximize natural light and ventilation through façade screens, shading devices and courtyards to reduce energy and maintenance costs. Rainwater harvesting, solar panels and sewage treatments are sustainable and renewable energy sources – along with natural vegetation.”

Ar. Priyanka Khanna and Rudraksh Charan, Architects and Interior Designers, 42 MM Architecture, New Delhi, discuss the aesthetics of the space saying, “Using renewable resources such as natural light and planters accentuate visual appeal and spatial quality, along with recycled wood, cork and ceramic. Speaking of technology, energy-efficient lighting, double-glazed windows and automation optimizes energy consumption as per the user’s need.

Finally, the space can be accessorized with revamped furniture, art from scrap materials and sourcing locally antique products.”

Ar. Damith Premathilake, Principal Architect, Damith Premathilake Architects, believes, “Sustainability shouldn’t be a secondary aspect; it must be incorporated into the project conception itself by minimizing footprint and orienting the building accordingly. We are inspired by traditional architecture such as water bodies, courtyards, light wells and repurpose materials for our designs. For our residential project in Diyathalawa, we have used reclaimed timber from pallet boxes as the primary material.”

Architects Gauri Satam and Tejesh Patil, Founders, Untag Architects, Mumbai, focus more on solar orientation. They explain, “A building can be sensitively designed by studying the site’s solar geometry and incorporating active and passive solar techniques. Software simulations to integrate passive solar strategies to assess the performance of a built form, rat-trap bonds for insulation and evaporative cooling reduce temperature.”



hornbill house, nilgiri | biome environmental solutions, bengaluru

## a blend of materials and technology

Today, sustainability isn’t simply a topic read about in books. Architects attribute their interest in sustainable architecture to genuine ecological concern, as Ar. Anna Heringer says, “Humans are deeply connected to earth on both a physical and psychological level; though concrete is helpful in many cases, we must prevent its overuse to cope with climate change. I believe that building with natural materials also brings a human touch to it, which gives birth to a community. Last but not the least, natural structures can return to the planet once they have outgrown their use.”

Technology – it depends on the project – for certain structures, I rely on water and labour, while in other areas, I rely on machinery due to the high labour taxes. I believe in designing sustainable projects at the grassroot level, instead of simply building a structure with aluminium and steel, and just adding solar panels on top – it’s unsustainable.”

Ar. Amarnath Duleep adds, “Natural building involves the mason’s constant engagement and attention, and we prefer manual work apart from a few power tools.”

modern education and training institute, bangladesh | anna heringer, germany



crystal corporation pvt. ltd. office, new delhi | 42 mm architecture, new delhi

## challenges and costs

Though sustainability is a long-term need, are we equipped to deal with it? Anna Heringer says, “If we simply trust that decay is a part of life and nature, we would cease to use cement, concrete, steel and waterproofing to make long standing buildings. Sustainable projects are expensive in Germany, and we need to ensure that sustainable raw materials are affordable enough for all to use. Local materials should not be taxed, as they give rise to the cheapest and most logical building designs – all we need to do is to educate ourselves.”

Ar. Rahul Kadri says, “The initial cost of sustainable systems might seem high; however, one will enjoy the returns in the lifecycle cost of the project in the next five years. We have seen a significant advancement in the model and simulation platforms to simplify the process of designing sustainable buildings, such as BIM (Building Integrated Modelling) and software that assists in the lifecycle analysis of these structures. Finally, most architects see sustainability as the responsibility of the environmental consultant rather than as a part of the design.

Vernacular architecture such as placing longer facades facing the North and South, large windows that allow glare-free light, sunshades in the South West that prevent heat gain and open spaces are inexpensive alternatives. A courtyard and jaali screens aids in cooling, cross-ventilation and ample daylight while reduces artificial lighting and mechanical cooling.” Speaking of the importance of rural communities, Ar. Amarnath Duleep says, “Rural areas are more favorable for sustainability, as local materials are readily available. Consumer bias and misconceptions are equally tough hurdles, especially when the clients choose readymade material such as cement. Also, skilled craftspersons for lime and bamboo are harder to find over people oriented towards conventional materials. Natural materials don’t exhaust energy sources in their production, extraction and processing.”

Architects Gauri Satam and Tejesh Patil add, “Apart from the lack of alternative technology and skilled karigars, solar photovoltaic cells, mechanical cooling systems and rainwater harvesting need



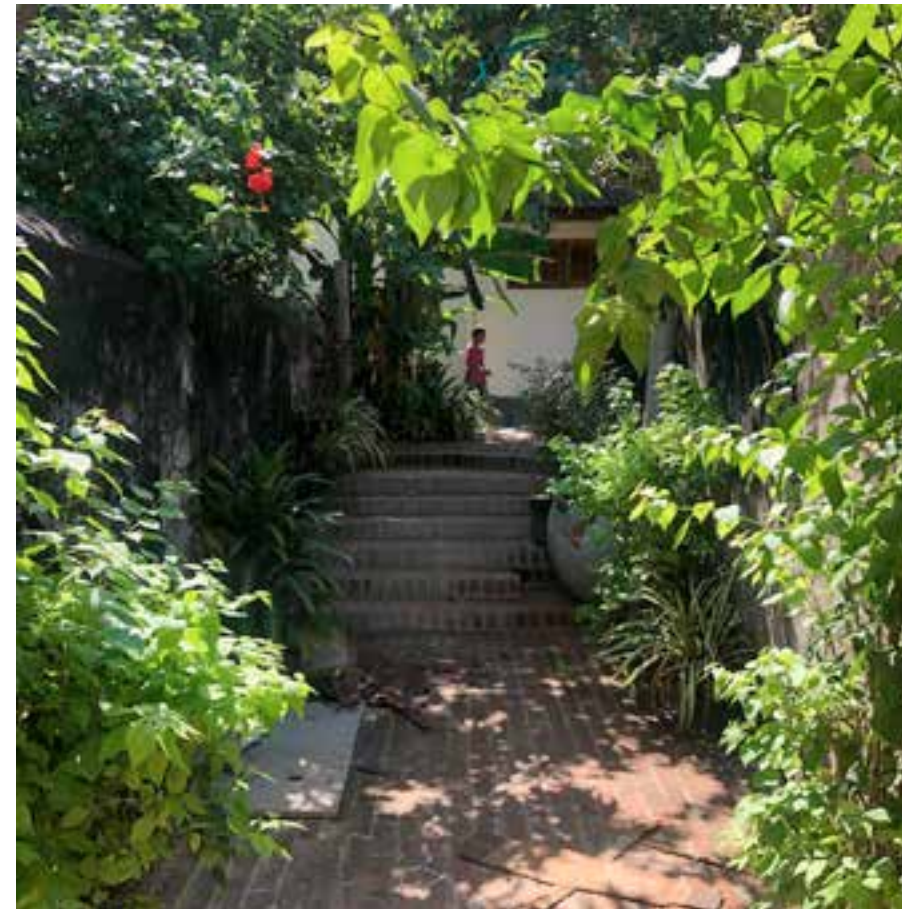


bamboo hostels, china | anna heringer, germany

a higher capital investment with long-term gains, and it could be difficult to convince a client. Use solar geometry for orientation, channelizing local breeze through cross-ventilation, recycling wastewater, recharging groundwater and bringing in natural light to reduce costs in a sustainable project.”

Pointing to the reality of building in a less developed country, Ar. Mitu Mathur says, “India is a developing country, and it is a challenge to combine locally-

sourced materials with new technology for building projects. Intelligent decision-making, capacity and knowledge deliver sustainable solutions. The economic and environmental aspects of a building conflict with each other, thus designs must ensure that they don’t impact the planet. Sustainable buildings are resource-efficient with a low operation cost make the projects sustainable with alternative building materials, natural lighting, low-VOC paint and recycling construction waste.”



padal residence, kakinada | studio inscape, hyderabad



stonex, kishangarh | urbanscape architects, new delhi

stone house,spain | nomo studio, spain



photography : : joan guillamat

a house in a gaathan, dakivali | untag architecture and interiors, mumbai



photography : : untag architecture & interiors

## outlook for the future

Now that the importance of sustainable architecture is well-known, how will it fare in the future? Ar. Anna Heringer says, “We must accept that death is a part of life, which will remove the need to add steel, cement and cladding to combat the vulnerabilities of natural building materials. The governments must bring carbon taxes and make sustainable materials cheaper than conventional ones.”

Ar. Rahul Kadri agrees, “Sustainable neighborhoods – a self-sustaining unit with locally-available public facilities and amenities – could reduce travel time, carbon emissions and pollution. They ensure the optimization of resources and services, reduce wastage and ensure efficient costing.”

Pointing to the importance of government intervention and ownership of the problem, Ar. Amarnath Duleep says, “The government must

implement climate policy, decision-making and legislation regarding sustainability as there have been several conversations around this. Once considered a radical topic, sustainability now influences public discourse in every discipline: technology, economics, philosophy, architecture and design – and we seek solutions. Therefore, researchers and policymakers must develop sustainable building and city designs. A multidisciplinary collaboration of architects and planners with socio-political participation, technological innovation, public education and government leadership shall bring a change.”

Architects Gauri Satam and Tejesh Patil, sum up saying, “Sustainability is a lifestyle about conscious decision-making, recycling and upcycling what we have consumed. It is not limited to architecture, but about incorporating productive landscapes by creating local-food cycles, native diversity and creating a worldwide awareness of ‘Less is More’.” ॥





# CRYSTAL CORPORATION PVT. LTD. OFFICE, NEW DELHI

42 MM Architecture, New Delhi

## Design brief and aim

To create a green office for an agrochemical manufacturer using natural raw materials, which would showcase the essence of the company.

## How this was accomplished

Built across 34,000 sq. ft., the first and second floors of the structure house the corporate office, while the ground floor was left undefined for future expansion. The reception area has a reclaimed wooden reception table that sits in front of

a solid green wall, flanked by a strand-board wall cladding and a naturally-illuminated and ventilated space. A double-height area with a light well brings in filtered light percolating through a passive solar device, which collects solar energy as well.

Concrete and reclaimed wooden flooring contrast with the bamboo ceiling, which gives the project an earthy, organic feel. Minimalistic furniture on green grass comprise the breakout areas, which are meticulously integrated into the façade, while the light well brings in filtered light percolating through a passive solar device.



photography :: ravi kanande





# MODERN EDUCATION AND TRAINING INSTITUTE, BANGLADESH

Anna Heringer, Germany

## Design brief and aim

To construct a school that reflects the emphasis on developing the students' potential creatively and responsibly. It strives to improve existing building techniques and contribute to sustainability by utilizing the local potential and strengthening regional identity.

## How this was accomplished

Most vernacular architecture in Bangladesh uses earth and bamboo as the primary building materials; however, there are erroneous construction techniques such as a lack of foundation and damp-proof coursing in the buildings. The project aimed at improving the quality of life in rural areas and to counteract the continuing migration to the cities. It also prioritizes low labor costs and locally-available resources such as earth and bamboo. Traditional building techniques were developed and passed onto the local tradesmen, thus transforming the process.

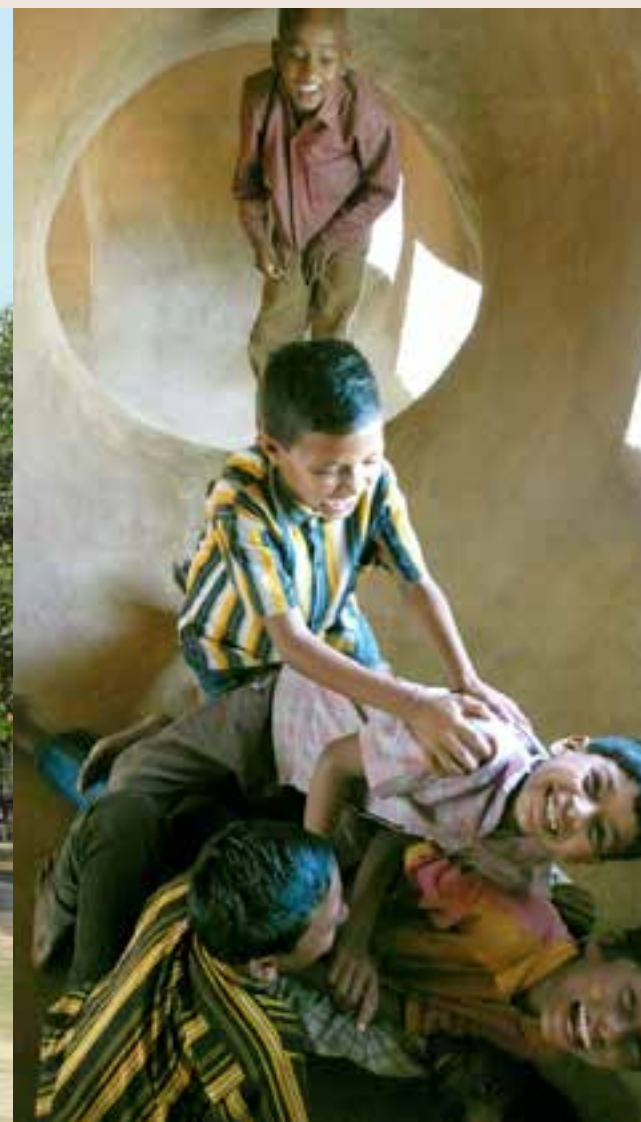


The building rests on a 50-cm-deep brick masonry foundation rendered with facing cement plaster, along with a damp-proof course, which is a double layer of locally-available PE (polyethylene) film. On the ground floor, the load-bearing walls are constructed using straw-earth mixture heaped onto the foundation wall to a height of 65 cm. per layer. After the fourth layer, a ring beam made of thick bamboo canes is integrated into the ceiling as a wall plate.

A triple layer of bamboo canes is used for the ceiling of the ground floor, with the central layer arranged perpendicular to the layer above and beneath for lateral stabilization and connection between the supporting beams. A layer of planking made of split bamboo canes is laid out on the central layer and filled with the earthen mixture as traditionally used in European timber-framed ceilings. Three classrooms constructed with thick earthen walls, are located on the ground floor, each with access to an organic

'cave system' at the back. The soft interiors of these spaces were designed for exploration or concentration, individually or in a group. The upper story is a frame construction of four-layered bamboo beams arranged at right angles to the building. The end of the frames at the short ends of the buildings and the stairs strengthen the building, which is further connected by additional structural members and wind bracing on the upper surface of the frame.

A series of bamboo rafters at intervals of the frame construction, provide support for the corrugated iron roof and are covered with timber paneling and adjusted in height for sufficient run-off. It is light and open, with openings in the bamboo walls that offer sweeping views of the treetops and village pond. The large interior space enables free movement, while light and shadows from the bamboo contrast with the colorful saris on the ceiling.





# BAMBOO HOSTELS, CHINA

Anna Heringer, Germany

## Design brief and aims

To celebrate the beauty of natural materials for two hostels and one guest house.

## How this was accomplished

Spread over 1,153 sq. m., the project was part of the Longquan International Biennale that sought to build bamboo structures; 12 architects were invited to build them. The structure of the hostels is formed out of a core made with rammed earth and stones, which hosts all facility units and stairs. The sleeping units are designed like Chinese lampshades that light up at night, surrounded by a woven bamboo structure.



Local craftsmen used applied techniques for bamboo weaving and rammed earth, labor-intensive tasks that benefit the community. The project aimed to reconnect with authentic cultural goods that blend the strength of bamboo and traditional basket weaving, such as ceramic vessels in Baoxi.

The energy system is based on traditional concepts such as fire, sun, wind, shade, plants, and minimizing conditioned spaces. The cocoons are thermally controlled and further protected from the rain and heat. Fire is used as a heating source, apart from an oven that heats water for the showers, which is supported by solar collectors.







# ANANDOLOY, BANGLADESH

Anna Heringer, Germany

## Design brief and aim

To construct a center for people with special needs and a studio for the production of Dipdii textiles.

## How this was accomplished

The project was built using local materials, local energy sources, local labor and global knowledge. Anandoloy was built out of mud and bamboo by local farmers, and a major part of the budget was invested in local craftswomen.

The building was initially planned as a therapy center, which was later extended to another block that hosts Dipdii Textiles, a studio for the women tailors of the



village. Spread over 174 sq. m., the concept provides therapy for people with special needs and aids them in learning, working and engaging in the community. Mud was used in creative ways throughout the project, as the firm felt that it was far stronger and superior to brick and used a cob mud building technique, where no framework is needed to construct walls. A large ramp leads up to the first floor to include people from all walks of life, and the structure

follows curves symbolizing diversity among people. Apart from a fired brick foundation, there are bamboo pillars, ceilings and roof structures. Straw roofs are used for the lower level, while a metal sheet roof is used for the upper terrace.

Note : Cob building is derived from the Old English term for "lump." A mix of clay, sand and straw is kneaded by foot into lumps, and built into solid, monolithic walls nearly as durable as concrete.





balcony spaces on all the floors facilitate interactive spillover spaces in the workshop and boardroom respectively. Higher ceilings insulate the roof and local brick bat coba is used for weather-proofing the RCC-framed structure.

Wire-cut bricks and adobe bricks were used for the walls; the adobe bricks were locally manufactured by mixing black cotton soil with fly ash, cement and lime. Dedicated spaces were chosen for indoor plants and herbs, with native fruit growing in the open areas. The

wetland provides nesting spaces for summer birds with its aquatic and semi-aquatic vegetation. Operational energy usage was reduced through LED fixtures, energy-efficient fans, and air-cooling systems, which has reduced energy consumptions by two-thirds.

Energy is produced by a 20kVa solar PV panel system installed on the rooftop, and rainwater harvesting provides water for four months while the excess is used for recharge. Water-efficient fixtures reduce water consumption.

# ACTION FOR SOCIAL ADVANCEMENT, BHOPAL

Biome Environmental Solutions, Bengaluru

## Design brief and aim

To design a non-profit development organization that ensures livelihoods through natural resource development.

## How this was accomplished

At the outset, the client wanted the space to foster an inclusive and collaborative work culture. Formerly an agricultural piece of land on the lowest level, the presence of black cotton soil made it prone to waterlogging due to poor outflow. The firm took up the challenge and raised the building by a floor, while the sunken area was converted into a wetland

and a steeped well. This prevents flooding and encourages the replenishment of shallow aquifers, while the stepped wall acts as a community space.

Passive building planning, energy efficiency, water management and biodiversity remain pivotal to the design. Deep overhangs and courtyards reduce heat gain and glare, ensuring ample natural daylight. The eastern and western facades have windows skewed to the horizontal sun glare without compromising on daylight and fresh air. A landscaped court on the top floor, common court and







# SWASTIKA DANCE STUDIO, BENGALURU

Biome Environmental Solutions, Bengaluru

## Design brief and aim

To construct a dance and music studio as an intimate platform for the performing arts at a small scale, which would also serve as a venue for workshops and small events.

## How this was accomplished

While constructing the project, the firm had to face the challenges of a multifunctional tight site and requirement. Partially sinking the building allows the dance studio's double-height volume to be acoustically sound without

compromising on light and ventilation. It provides the soil to make stabilized mud bricks to build the structure as well.

A narrow skylight at the east and precast concrete ring windows create interesting light and shadows in the day. Additional light pours in through the common frontcourt, which connects all three levels of the studio and renders the spaces interactive during performances and events.

A staircase supported on a brick vault leads to the ground level, where the car parking

area serves as a temporary waiting area. The solid central core of the staircase was made with mud rendered plum concrete using construction debris with aggregate and cylindrical openings, which forms the façade along with the West Indian elm tree at the entrance. A metal staircase takes up to the first level, which comprises a music studio, an outdoor platform, an office and a common washroom.

The music studio and platform are separated by full-height glazing, opening up to become a large performance space. The

double-height open space is shaded by a sloping roof made of processed tetra pack corrugated sheets with a central skylight. Rainwater from the roof is harvested and reused for the studio's requirements.

A gallery on the second floor looks over the performance area and leads to the guest suites for visiting trainers of dance, music and yoga. The three levels are vertically connected by a triple-height frontcourt that promotes lively interaction among the students in an open environment.



photography : : vivek muthuramalingam





# HORNBILL HOUSE, NILGIRI

Biome Environmental Solutions, Bengaluru

## Design brief and aim

To renovate an existing bungalow and build eight additional bungalows on a 135-acre estate, to be rented out as farm stays.

## How this was accomplished

The project was realized at Oland Estate, a tea and coffee plantation that borders forest lands. The brief was to renovate an existing bungalow,

and construct eight more bungalows. These structures were spread across the expansive property instead of designed as a close-knit development. Motorable roads and footpaths were built, and the bungalows built based on the views, easy access and privacy.

The Hornbill House is located in an old drying yard, bordered by a waterfall, layered against tea gardens and a



mountainous background. Care was taken to ensure that no additional land was diverted from farming to construction and that there was no change in topography, which leads to soil erosion and construction waste deposit in the streams. The walls are a composite of stone on the outside and mud bricks on the inside. The exterior stone wall blends with the rock face near the location, while the mud walls provide warmth and shelter. The reused materials were retrieved from the old yard and the dilapidated watchman's quarters.

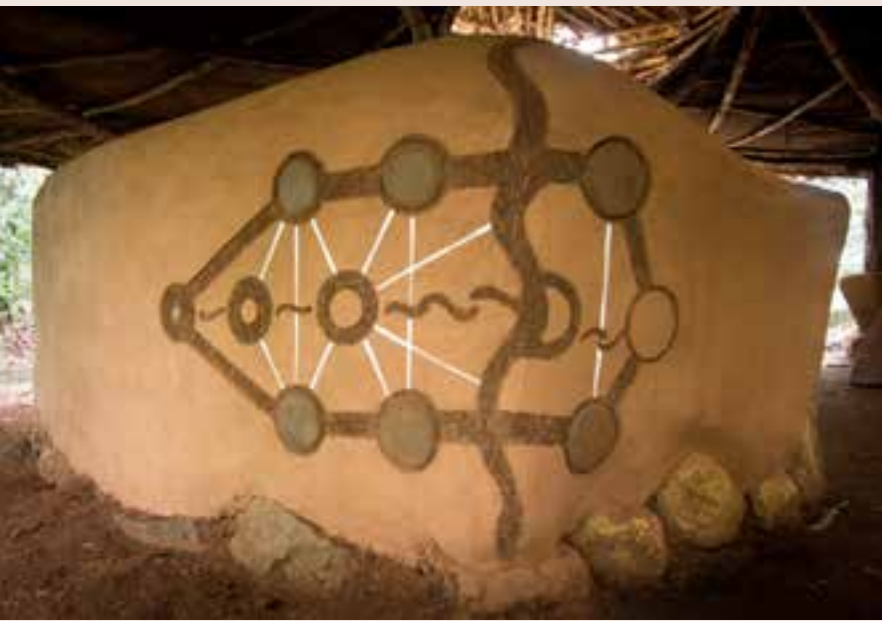
Roads were repaired and slopes stabilized, which provided soil to make compressed stabilized earth blocks (CSEB) to build the walls. Broken Dado tiles were used to create a mosaic in the toilet.



photography :: vivek muthuramalingam

FOCUS





# JHOPDI, PUNE

## Chronicles of Mud, Pune

### Design brief and aim

To experiment with natural building practices, using local materials, reduced transportation, biodegradable ingredients and sustainable practices, while building a house.

### How this was accomplished

Approximately 35 sacks of sand were used for custom-made plaster, with 20 sacks of lime brought in from Mumbai. The structure was made of natural material; the waterproof roof was achieved with recycled PVC sheets that were previously used as canopies for the nurseries and greenhouses in the region. The cob was made out of local soil dug out of a mound adjacent to the kitchen, while the straw used as fiber was cut from the surroundings and used in the mixture.

Deadwood was used in the reciprocal-style kitchen roof that lines the boundary of the property. The karvi is an indigenous reed widely used by the tribal communities in Maharashtra to make reed lattice, which was plastered to make the ceilings of the structure.



Locally-found stone and boulders make up the foundation. Plaster gives a neat finish to the cob structure, with customized natural plasters made with suitable ingredients submerged in water and left to ferment for two weeks. Fermentation breaks down the straw fibers present in the plaster mix to produce viscid enzymes that bond the plaster to their substrates, ending with aged plaster applied using plaster trowels or by hand.

The plaster art technique called Sgraffito, which entails multiple layers of plaster in a particular sequence to create murals and other decorative reliefs, was used. Manually-extracted natural pigments from plants and minerals added an earthen feel to the site, made from materials that were crushed, hand-ground and mixed with a carrier medium to obtain high-quality paint. A wood-fired oven and grill sculpted out of locally-produced clay soil lie near the outdoor cob kitchen, and clay and lime-based plaster, composed

of site soil, render a rustic vibe. Motifs with plaster finishes and natural surfaces brighten up the mud kitchen, complete with a seating area for 12.







# HOLIDAY HOME AT DIYATHALAWA, SRI LANKA

Damith Premathilake Architects, Sri Lanka

## Design brief and aim

To create a cottage in the dry zone about two kilometers away from the Diyathalawa military training school.

## How this was accomplished

Perched on a cliff in a forest of pine trees, the cabin is built in a climate that has a temperature of about 20 degree Celsius throughout the year. The hut follows an adaptive reuse of timber pallet shipping boxes to construct prominent features, especially in the upper floor of the cottage. Leftover timber strips during the construction process were reused to form a screen of handmade timber boxes along the side of the cottage.

The two-storied structure was designed to suit the climate, which makes an energy-efficient option as compared to non-renewable building materials. On-site construction waste was used to build



a feature wall that runs along a narrow corridor that connects the dining area to the service area. Foot-long timber strips join together to form hollow cuboids, which creates fenestrations on the eastern façade. Apart from timber, steel and rubble were used in varying proportions to create the desired spatial quality.

Timber requires minimal processing energy and does not emit greenhouse gases, compared to steel and concrete. It allows more spaces for insulation than other building materials, and needs less fossil fuels. Due to lower thermal conductivity, it results in a lower thermal diffusivity.





# PERSONALIZED HOUSE AT ANDERSON ROAD, DEHIWALA, SRI LANKA

Damith Premathilake Architects, Sri Lanka

## Design brief and aim

To create a personalized home experience.

## How this was accomplished

Spread over 8,565 sq. ft., the residence was built on a 31-perch block of land that fringes on the otherwise haphazardly designed neighborhood. Clear lines and simple flowing spaces are devoid of unnecessary ornamentation, and showcase the luxurious lifestyle of the occupants.

A classic U-shaped floor plan optimizes privacy and promotes the influx of ample natural daylight and cross-ventilation. Ascending from the entrance, a timber façade seamlessly weaves into the white-washed interiors that are flooded with daylight. Bedrooms are extended to the passageway acting as a balcony. Passive cooling strategies ensure an ambient indoor thermal climate and ventilation. Canopies shield the site from excessive heat while the pool and surrounding foliage further contribute to the livability of the space.



An entertainment area perched atop the southern wing is centralized towards the residential fabric, buffering all the private activities located at the northern connecting wing. A conventional material palette of concrete, steel and timber along with rubble walls is used, against the subdued backdrop. Timber fenestrations add a pleasing contrast, while white marble flooring adds luxury to the gardens. Steel columns leading to the upper floors are clad with timber to conceal downpipes.

Natural cut and polished cement walls contrast with the white walls, and reduce the enclosed aspect of the U-shaped plan, allowing the trees to blend with the ambience. The tropical greenery extends into a cascading terraced garden merging with the pool. Three canopy levels, including wild black plum, kaim and a large canopy reach up to the rubble wall. Strawberry, guava and amber trucks form the second canopy level, while ferns form the lowest level.







# HOUSE OF SILENCE, KALALGODA, SRI LANKA

Damith Premathilake Architects, Sri Lanka

## Design brief and aim

To design a house in a tropical context.

## How this was accomplished

The Kalalgoda House sits on a 14.4 perch land adjoining a paddy field, designed for its tropical context to achieve an ideal orientation. The front of the land faces the entry road while the rear side faces the paddy field, which facilitates natural ventilation inside the house. Cool earthy colors reflect nature's greenery and blend in the outdoors and indoors.

At the entrance, the garden space is paved with red gravel and hosts several trees. A shallow pond in the center of the house leads to a brick wall, adding depth and texture to the space.



The two-storied house opens up into a double-height space, partially open to the sky, with two 'dan' trees rising up from the pond. Reused railway sleepers and porous exposed brick walls break the monotony, as seen in the entry and garage door. Ivory-colored titanium floor and timber enhance natural lighting, and the use of vertical timber screens in the bedrooms result in greater privacy and natural ventilation.

Existing trees and terraces in the upper levels create interesting spaces, which complements the canopies on the site. Visual effects and spatial flow are incorporated for comfortable living throughout the two levels of the house, maintaining intimacy and aesthetic beauty.

Note : A perch is a unit of measurement of land in Sri Lanka. 1 Perch = 25.29 Sqm.



photography : : ar. eresh weerasuriya





# ENVIRONMENTAL SANITATION INSTITUTE (ESI), SUGHAD, GANDHINAGAR

Footprints E.A.R.T.H., Ahmedabad

## Design brief and aim

To construct a sustainable and free-flowing institute that promotes interaction, involvement and interchange.

## How this was accomplished

The ESI conducts training, education and awareness programs in the field of environmental sanitation and health. The institute consists of academic areas, library and resource center, computer rooms, outdoor demonstration spaces, multipurpose halls, administration centers, amphitheaters and residential

spaces — open and semi-covered for various purposes.

The entry is through the smaller triangular plot on the southeast, where three trees act as visual guides in the process. The junction of the rectangular and triangular plots leads to the residential and service areas to the south, with a garden on the north. Higher massing at the south provides views of the garden and shades the lower masses on the north, and are clearly visible from the bridge across the canal.



Spread over 7,418 sq. m, the building was oriented to regulate breeze and solar gain and respond to the hot and dry conditions of the site. Increased massing towards the southwest exploits shaded areas to the northeast by accommodating the activity areas, courts and streets. North-facing terraces on the upper floors, decks and open plinths offer multiple opportunities for interaction. Fenestrations regulate convective heat loss and optimize daylight, while brick cavity walls insulate the interiors from the high-ambient atmospheric temperatures and incoming solar radiation.

A subterranean build with shared adjacent walls prevents excessive heat gain, and selectively-controlled massing provides mutual shade, breaks up continuous spaces and reduces reflected glare. Overhangs determined by shadow-throw studies and sun-angle analysis control solar penetration and reduce atmospheric glare in the interiors.

The landscape facilitates microclimate control through local shading by trees against south-facing walls. Wind turbulences formed by built form and vegetation prevent soil erosion and aid in surface glare control. Landscape treatment in the form of cut-and-fill on a flat site promotes solar passive design such as evaporative cooling and berming. Kitchen gardens and orchards optimize available land resources and use treated sullage for irrigation and mulched organic waste as manure, which are cost-efficient measures as well.

Rainwater harvesting (rooftop, open ground and garden) is practiced for sanitation, drinking and gardening. Organic solid waste managed through soak pits is repurposed to produce biogas for the kitchen. The lavatories are designed with a minimized water-borne carriage system that enhances sustainability and maintains sanitation. Solar photovoltaic and heating panels along with dehumidifiers and fans were envisaged as low-energy devices to supplement the solar passive design.







# MANAV SADHANA ACTIVITY CENTRE AND CRECHE, AHMEDABAD

Footprints E.A.R.T.H, Ahmedabad



## Design brief and aim

To construct an NGO within the largest squatter settlement of Ahmedabad, which serves as an informal school for young children in the morning, an evening education facility for adults and is also a vocational training center and activity workshop for the manufacturing of craft-based products by women and the elderly.

## How this was accomplished

Spread over 11,00 sq. m., the space includes an administrative unit, all-religion meditation unit and dormitory, apart from the school. A creche and community center were later additions, along with a gymnasium and health center. The structure was built using components that included recycled municipal waste, which reduces pollution, is cheaper and offers superior-quality building alternatives for the urban poor.

The walls, roofs, slabs, doors and windows are made with simple hand-operated tools, partially using the help of the end-users. Cement-bonded fly-ash bricks and mold-compressed bricks made from landfill site waste residue, stabilized soil blocks, recycled glass and plastic bottles filled with ash and waste residue were used. Vegetable crate wooden paneling was used in the inner partition walls, while cement-bonded particleboard with a clay tile cover and a light conduit pipe truss with G.I. sheets with clay tile roofs promote sustainable use of architecture.

Shredded packaging wrapper and coated paper waste are a substitute for fiber reinforced plastic (FRP) for the door paneling. Oil tin containers as blades make the ventilation louvers and cladding in the toilets. Fly ash and waste residue molded tiles with inlaid ceramic industry waste as china mosaic was applied in patches for their demonstration. Broken stone, tile residue, metal scrap, stone cutter blades, bars of broken slabs and rag-reinforced FRP panels were used in construction.







# UJASIYU, AHMEDABAD

Footprints E.A.R.T.H, Ahmedabad

## Design brief and aim

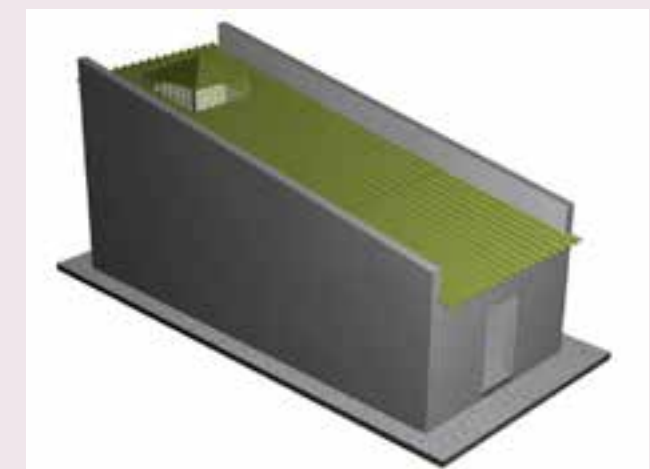
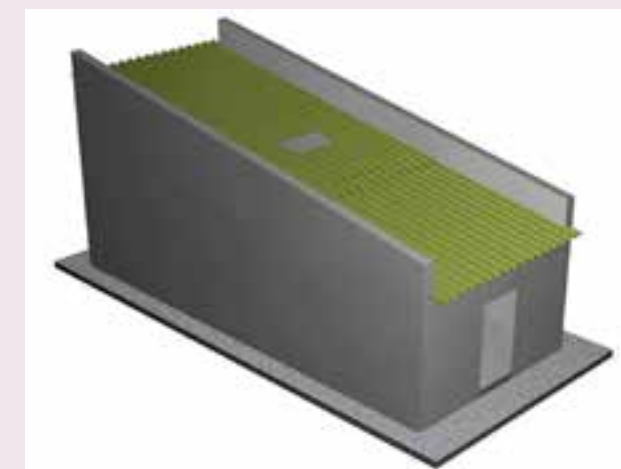
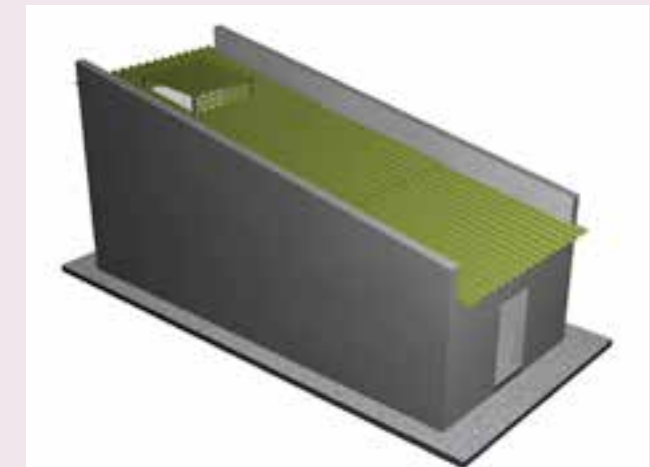
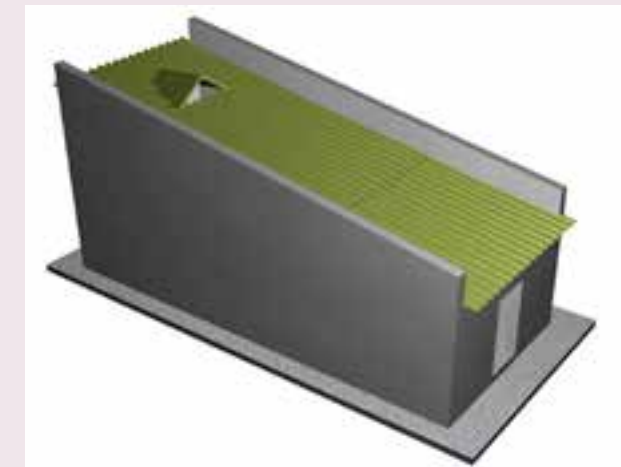
To construct an Innovation Centre supported by the Solar Electric Light Company (SELCO), initiated by the Mahila Housing Sewa Trust and Sewa Bank – with a focus on a sustainable and affordable lighting and ventilation for the urban poor.

## How this was accomplished

Non-mechanized, cost-efficient and sustainable steps were taken to ventilate the space, with natural daylight possibilities for health, ventilation and economical purposes. This increases work efficiency for home-based workshops and production as well as environmental aspects by consuming less energy.



Fiber-reinforced translucent corrugated sheets with built-in dormer windows allow for ventilation, diffused glare and heat-free light, while the aperture offers a natural passage for hot air ventilation. Low-energy electrical fixtures offer 50 per cent savings on electricity bills, replacing old tungsten bulb lighting.



photography :: hrday creations

FOCUS





# GANDHI- NU-GAM LUDIYA, KUTCH

Footprints E.A.R.T.H, Ahmedabad

## Design brief and aim

To design a shelter system as a part of a rehabilitation program after the 2001 Gujarat earthquake.

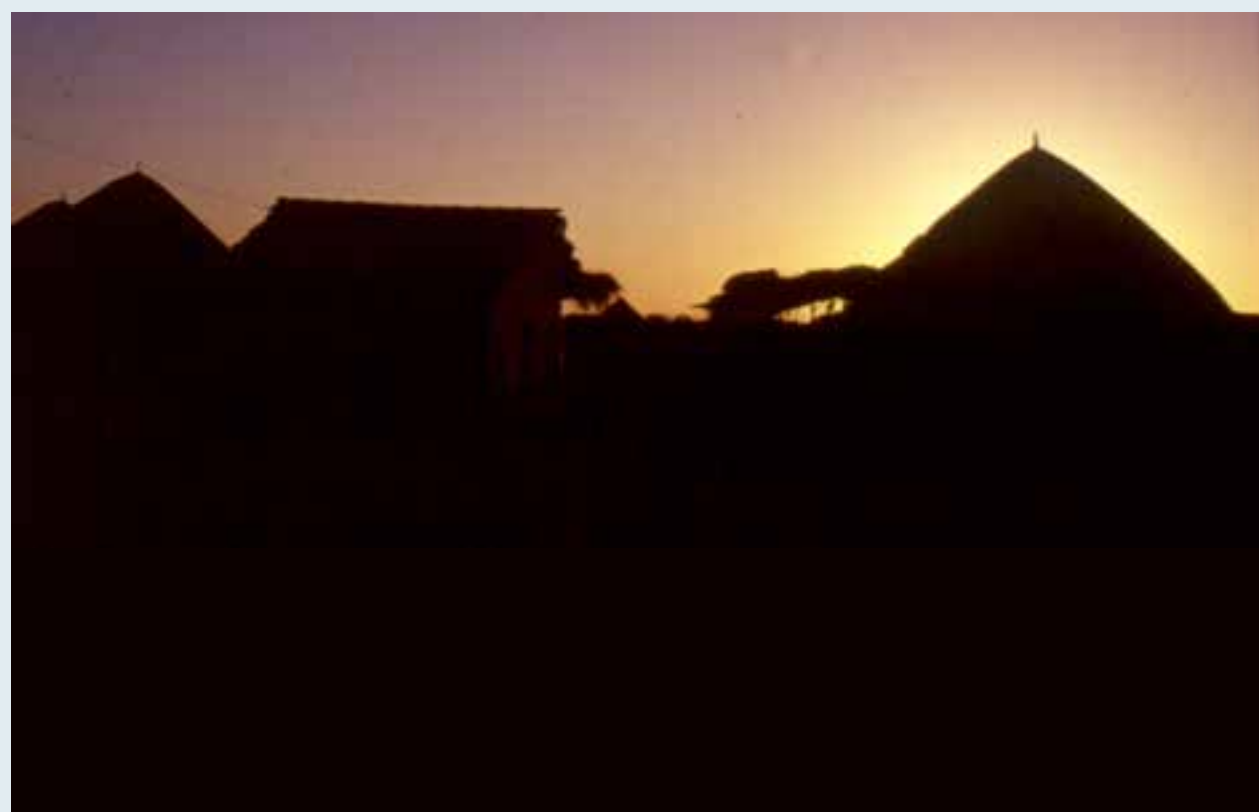
## How this was accomplished

A total of 455 bhungas – traditional circular hamlets – were designed with conical thatched roofs with clay and mirror work relief, in an earthquake-resistant block. The structures include health centers, grass banks, sanitation blocks, shrines, rainwater harvesting ponds and check dams. The homes are climatically comfortable in the hot and arid desert environment and socio-culturally appropriate to the tribal lifestyle.



An earthquake-proof design due to its round form, the structures have a low slenderness ratio, thick wall, stiffened base, multi-layer plastering, earthen material and small openings with conical thatched roofs. There are smokeless stoves for a healthier kitchen environment and house-to-house sanitation systems for comfort and hygiene.

Solar photovoltaic cell lighting ensures minimum lighting needs with decentralized systems and the decentralized sewerage system ensures hygiene and sanitation.







a regular cut-and-fill approach was avoided during construction. A contoured site and uneven soil was used as an opportunity to envisage an academic hub that evolved with the optimization of the natural slope. The site planning adopts a landscape-integrated approach, where the placement of built volumes respects climatic factors to create a visually aesthetic environment.

The elements are designed as connect entities in their context, forming a neighborhood-supporting community, needed for all academic institutions. The faculty and students get the opportunity to engage themselves in an integrated process of designing, constructing, and operating buildings. The highest point of the site is planned as the library, which is designed as a series of interactive nodes and landscaped plaza flanked by studios, classrooms, and workshops on opposites. The semi-open circulation corridors, crowned by

a canopy, penetrate the academic blocks, which allows a collaborative exchange of intellectual and technical knowledge.

The interiors of the classrooms and workshops were designed as per a modern studio, making it an adaptable and interactive space. A dedicated auditorium was designed close to the academic block and library, along with separate parking for 500 ECUs. The amphitheatre, acting as a congregation spot, has a cafeteria underneath.

The institute was designed to allow for future expansion and incorporates a solar passive design for energy-efficiency purposes. Treated water from the STP (sewage treatment plant) is utilized for the landscape, dual flushing systems and green building strategies minimize operational costs, resulting in an IGBC Gold Rating. Rocks that were broken down at the time of excavation were used in the planters and landscape on site.



# NATIONAL INSTITUTE OF DESIGN, BHOPAL

Gian P. Mathur & Associates Pvt. Ltd., New Delhi

## Design brief and aim

To design a campus, which aims at maximizing opportunities for interaction, engagement and exchange of ideas.

## How this was accomplished

Spread over 30 acres of land, the rocky and barren terrain had a level difference of almost 12 meters from the highest to the lowest points. A minimalistic approach was utilized to reduce the excavation costs and environmental impact, and





# AURIC HALL, AURANGABAD

IMK Architects, Mumbai

## Design brief and aim

To design a socially-responsive office building spread over 2.5 lakh sq. ft., located in the Central Business District of the Aurangabad Industrial City (Auric).

## How this was accomplished

Auric Hall was conceptualized as the district administration and monitoring center for the smart city, to house the main command control room and centrally manage the civic facilities on a real-time platform. It offers incubation spaces to industrial houses and a sales center, which promotes engagement and interaction of ideas. Post-tension beams enable the large spaces and service height clearances within a proportionate floor-to-floor height.

Steel was used for the façade and roof truss due to its durability, structural flexibility and load-bearing capacity. Structural steel components were easy to assemble on site, while the laser-cut aluminum panels are used for the external jaali as it is lightweight, durable and low-maintenance.

The building is oriented to allow maximum glare-free light into the office spaces, and minimizes heat gain by 83.40 per cent. Additionally, six per cent of the lighting consumption of the building is derived from 15kWp solar PV cells installed on the roof. The large central north-facing atrium has a glass surface to optimize the northern daylight, with office blocks abutting it on the other sides. Wrapped in a modular jaali, the screen controls the airflow and lowers the temperature of internal spaces. Multi-wall polycarbonate sheet roofing was fitted with ceramic fritted glass, which is lightweight and needs a lighter truss design. This blocks glare, reduces air-conditioning cost for the sun-lit volume and minimizes solar heat gain.



A natural water body is located to the north of the CBD block, away from the Auric Hall. The Hall was relocated so the water body could add to the value of these spaces. Ceremonial gateways mark the entrances along the compound wall, and the internal driveway is inspired by the Char Bagh concept with a cascading water body, which is inspired by the Paan Chakki. Patterns are repeated on the glazed panels, with a network of two aluminum screen modules of the same motif from the jaali for the office spaces and terraces.

The porch leads to a large linear and full-height atrium enclosed by offices on three sides. Life lobbies open into green double-height terraces that face the south façade on one side and a long connecting corridor on the other. It serves as an exhibition space to display Aurangabad's history with staggered terraces punctuating the volume and north light filtering through the glazed façade.

Every floor has multiple terraces to encourage interaction. Open-plan office layouts enhance collaboration and productivity among employees. Entry-level spaces are free-flowing and transparent, promoting visual connectivity throughout the ground floor. Targeting an IGBC Gold rating, over 118 per cent of the site area is vegetated,

with 74.5 percent of the same planted with drought-resistant species. Irrigation features such as central shut-off valves, time-based controllers and pressure-regulating devices achieve water savings of 29.3 per cent. An on-site STP plant reduces potable water requirement of flushing, irrigation and construction requirements of 51.44 per cent. Aside from controlled irrigation, the run-off water from paved surfaces and terraces are harvested for groundwater recharge. Efficient plumbing fixtures and wastewater treatment system save water by 30 per cent.







# MINER ROAD HOUSE, CALIFORNIA

Faulkner Architects and DZINE Concept, California



## Design brief and aim

To construct a net-zero energy and sustainable home for a family of environmental scientists and their sons.

## How this was accomplished

The three-bedroom residence measuring 3,725 sq. m. was remodeled from a 1954 ranch house at the foothills next to a seasonal creek. The existing footprint was reused under the shade of a Valley Oak tree, and the fireplace – wrapped in concrete and utilized for structural support – is the only surviving portion of the original house.



photography :: joe fletcher photography, drone promotions (aerial)



The entry is through a steel plate-covered walkway leading to the front door on the south, to be greeted by 20-ft. ceilings, and floor-to-ceiling glazing. A 12-ft-wide retractable glass wall opens up the patio and adjoining garden, part of an open-living layout desired by the family. Secondary bedrooms are located along an extendable hallway, along with an outdoor dining area sandwiched between the family room and kitchen. A mezzanine features a master bedroom and study stacked above the kitchen and nook. A screened pacing deck shades the upper level from the harsh afternoon summer sun.

Cortel steel rain screens are used for the exterior skin, while wood ensures zero-annual maintenance costs and a shotcrete foundation allows the formwork to be repurposed for wood framing. Single-use materials such as the Corten steel and shotcrete foundation reduced complex detailing and labor costs, which allowed the budget to be reallocated for upgraded mechanical, insulation and glazing systems. Interior finishes produce acoustically-detailed, unfinished oak ceilings and walls.

The 14-gauge Corten rain screen provides a no-maintenance skin, and an 8.1kW photovoltaic system provides for renewable energy. High levels of insulation and glazing reduced heating and cooling loads, while rooftop rainwater is collected as a waterfall at the end of the hallway. Buried tanks store water for toilets and laundry, and grey water collected separately is reused for irrigation. Electronically-commutated motors and variable speed heat pumps further conserve energy use and control cooling and heating. An energy recovery ventilator provides fresh air.



# STONE HOUSE, SPAIN

Nomo Studio, Spain

## Design brief and aim

To design a family home.

## How this was accomplished

The structure is located on a hillside facing the north coast of Minorca, Spain. Superimposed stone layers (façade and fences) blend architecture and landscape into each other. The client brief was to include six bedrooms, a living room, dining room, kitchen, garage and auxiliary rooms. These are organized around a double-height space spanning across two floors. Thanks to the large upper floor glazing, the space brings in light to the otherwise narrow dark corridors of the house.

The house features a 100 sq. m. covered porch, which functions as an extension of the kitchen, dining and living room. The openable double-glazed façade acts as a thermal buffer and a wintergarden in the mild season, a shaded porch in the summer and the hot-air insulating system in the winter. Wild olive trees and the local vegetation surround a limestone platform with a grey stone-coated swimming pool.

The façade responds to a reinterpretation of the Minorcan custom of framing the windows and edges with white plaster, thus creating a geometric patchwork of off-white plaster light-colored stone. Thin steel frames project beyond the solid façade to protect the windows from direct sunlight and support the foldable wooden shutters. All the windows are aligned to the interiors and the frames are embedded from the outside, which creates the illusion of open holes on a stone wall.



photography :: joan gullamat



The interiors are a combination of continuous sand-colored concrete pavement, whitewashed walls, pinewood carpentry and white wooden beams. Built-in kitchen furniture and wardrobes were custom-made by a local carpenter, and details such as a solid hovering stair with integrated handrail-lighting combine traditional and contemporary architecture. Kitchen, wardrobes, libraries and niches were built in masonry, and there is an emphasis on soft indirect lighting. The house's highly-insulated skin, and the façade's solid-glass proportion and flexible shading techniques guarantee sustainability.







# ASI REISEN HEADQUARTERS, AUSTRIA

Snohetta, Oslo



## Design brief and aim

To develop a new head office for an international trekking and adventure company that would reflect the company's work culture and commitment to offering sustainable trekking experiences around the world.

## How this was accomplished

Combined with solid wood elements, the four-story timber building with an open office concept enables a long-term low environmental footprint. As a result, the building optimizes material use, open-floor plans and sustainable energy concepts along with high-tech and low-tech solutions.

A 'green curtain' of climbing plants grows on a suspended metal frame, covering the blackened wooden façade. Composed of 17 warm weather and evergreen species growing in planters, the curtain serves as a glare shield to shade the glass surfaces. On the western side, employees use the metal frame as a balcony. Approximately 118 climbing plants change the façade's appearance throughout the year, also adapting to its seasonal thermal insulation needs and reducing artificial cooling.



photography :: christian flatscher



For the façade, preserved wood using a traditional Japanese method known as 'yakisugi' was used. Slightly-charred and carbonized, the façade remains waterproof and durable without painting and protects against insects. The basement and building are made of reinforced concrete, while wood was used for the mullion-transom-façade, windows, floors and acoustic panels. Rooftop rainwater run-off is collected in an underground cistern, feeding the automatic irrigation system for the façade and garden. With 1,215 new plants in the open space consisting of 73 local species, the green façade contributes to local diversity.

The open-plan layout designed for 65 employees, can be adapted to future requirements. Gallery spaces create a large and flexible office, with a variety of individual workstations and collaborative zones. Glass surfaces offer panoramic views, while a large staircase and a double-height foyer (nicknamed the Base Camp) welcomes visitors.

Employee comfort was prioritized through designing communal spaces, meeting rooms, relaxation rooms, changing rooms and showers and a cafeteria. Shelves with plants offer visual relief, create storage spaces and informal work zones. A bridge connects the new building with an existing structure that contains meeting and relaxation rooms.

An optimized energy concept was tested and adapted using a thermal-dynamic building simulation. A reversible air-water heat pump system of 40 kW offers heat and coolness via underfloor services. Sensors measuring room temperature, humidity, carbon oxide, and wind control the natural ventilation using thermal lift and wind pressure conditions to circulate fresh air throughout the building. The constantly-monitored room climate regulates how wide and how long the ventilation flaps are open. The roof is covered with PV panels, and the electricity generated partly covers the power consumption of the building.

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about 500,000 kWh of solar energy. Viewed from the harbor, the façade's sides slant inwards, which gives a sense of the building 'bursting with energy'.

On the opposite end, the sloping roof reveals a cutout in the center that permits a natural inflow of daylight. Here, there is an atrium that functions as a public garden with horizontal glass windows on the sides, providing sunlight into the canteen below. The skewed lightwell allows daylight to enter the building and also offers stunning city views. Large glass windows and open spaces flood the area with daylight, contributing to an inviting work environment.

Also functioning as a small power plant, there is ample energy storage integrated into the building footprint, which can be used in the winter months with minimum daylight. Energy efficiency is accomplished through insulation and maximizing airflow to reduce the need for heating, heat recovery solutions to ventilate air and greywater, using seawater to heat and cool, and using energy-efficient electrical appliances.

In a concept called 'liquid light', artificial light is allowed to dim up and down as per the ongoing activity in the building. One of the many energy-saving strategies, the project thus consumes half the amount of energy typically required to light up a commercial building of similar size. Apart from office spaces, there is a café and visitor center on the ground

floor open to the public as an educational resource. Interestingly, the visitor centers expand on the energy-saving concept and support public knowledge and discourse on sustainable building strategies for the future.

The ventilation system provides clean air to the indoor spaces, along with technical installations for air supply that regulate ventilation. The building's structural system consists of thermal mass low-emission concrete exposed through strategic cutouts in the ceilings, which absorbs heat and cold without using electricity.

The Powerhouse Brattørkaia has received the BREEAM Outstanding Certification, the leading sustainability assessment method for its efforts. Furthermore, it supports the UNFCCC Paris Agreement that strives to limit the global temperature increase to 1.5 degrees Celsius.



# POWERHOUSE BRATTØRKAIA, NORWAY

Snohetta, Oslo

## Design brief and aim

To build the world's northernmost energy-positive building.

## How this was accomplished

The site is located in Trondheim, where the sunlight varies greatly between the seasons, making it a challenge to harvest and store solar energy. The 18,000 sq. m building is situated by the harbor and is clad with black aluminum and solar panels, reflected in the adjacent Trondheim Fjord. It aims to maximize the amount of clean energy produced by the building while minimizing the energy required to run it.

The site was chosen to ensure maximum exposure to the sun throughout the day and season. Its skewed pentagonal roof and upper part of the façade is clad with approximately 3,000 sq. m. of solar panels, which are strategically placed to harvest

photography : : iVan Kvaal





# POWERHOUSE TELEMARK, NORWAY

Snohetta, Oslo

## Design brief and aim

To build an 11-storied building, symbolizing the district as a leader of decarbonizing new construction.

## How this was accomplished

The south-east façade and roof of the Powerhouse Telemark generate 256,000 kWh every year, approximately 20 times the annual energy use of the average Norwegian household, and the surplus would be sold back to the energy grid.

The skewed and slightly conical building features a 45-degree tilting on the east-facing façade that stands out in the industrial context of the surrounding Heroya industry park. There is a reception, office space, two stories of co-working spaces, a shared staff restaurant, penthouse meeting spaces and a roof terrace overlooking the fjord. Two large staircases connect the building's ground and top floors, from the reception area up to the staff restaurant and the penthouse meeting rooms. A distinctive straight wooden staircase on the ninth visually connects the staff canteen and penthouse meeting room, leading visitors to the roof terrace.

The building has a 24-degree tilted roof that gently slopes and surpasses the extremities of the building's volume, which expands the roof's surface and ensures a maximum amount of solar energy that can be harvested both from the photovoltaic canopy and the building's PV-cell cladding the south-facing façade. To the



west, northwest, and northeast, the building is clad with wooden balusters that provide natural shading on the exposed façade. Behind the wooden balusters, the building is covered with façade panels that render a unified expression.

Functioning as a passive house, the building is insulated and features triple-isolated windows throughout. Concrete slabs make the building similar to a stone structure storing thermal heat during the day and emitting heat during the evening. A low-ex system with water loops in the border zones of each floor, assures efficient cooling and heating through geothermal wells dug 350 m. underground.

A series of low-tech solutions that ensure thermal comfort, allows the office building to be used to its full potential. The building's skewed west-facing and southeast-facing facades allow for maximum daylight and shading while creating flexible indoor spaces. To the northeast, the building is levelled to accommodate traditional workspaces with enclosed offices. Throughout the building, small and secluded spaces are strategically moved away from sun-exposed facades to reduce the need for cooling while ensuring a comfortable temperature.

Flooring, glass walls, office dividers, kitchenettes, lighting and bathrooms were given the same design, color and materiality across all floors. Flexible interiors combined with the building's two-storied co-working space allow the clients and future tenants to re-program (from desk space to resource space) the building without the need to relocate. Following low-energy consumption and resilience, the building uses local wood, gypsum, and environmental concrete that is left untreated and exposed. Carpet tiles are composed of 70 per cent recycled fishing nets and wooden flooring was made from the industrial parquet of ash from wooden debris.

A specially-designed foliage signage system allows maximum flexibility in designing office spaces without creating unnecessary waste. To obtain the BREEAM Excellent certification, vertical glass slots allow for daylight penetration on the three topmost floors, while loose furniture with light surfaces allows for interior lighting.



photography :: ivan kvaal





# THE BLUE HOUSE, PUNE

Studio Alternatives, Pune

## Design brief and aim

To reconceptualize used shipping container spaces into secure housing and accommodation spaces. Ranging from affordable to luxurious, their modular construction allows them to be deployed at remote areas, easily dismantled and re-installed at a new location. Sections can be added to maximize space, with services such as electricity, water and sewage either connected to the main grid, or use off-grid solutions.

## How this was accomplished

Made out of two 20-feet by 8-feet shipping containers (a third 20-feet container was added later), the residence is joined in an L-shaped configuration, creating a living space, kitchen, bedroom and bathroom. The primary material used was discarded shipping containers, which were sourced, repaired and made leak-proof before use. Reclaimed roof tiles sourced from a local village house were reused as the roof over the extended living space

Reclaimed wooden window shutters were used for the entrance door, while the staircase was created out of leftover container sheets, packaging crates and old sleeper wood. There is an openable deck with a hinged plane on the outer side of the first container, creating an enclosed additional space in the living room. The modular construction makes it easy for the user to add more sections to increase the space for future requirements. An old spiral staircase was sourced from scrap with a railing with discarded ACP sheets from petrol pump fabrication, while fabric scraps were used to make cushion and bed covers.



While first installed at the first location, the third container was fitted on top of the L-shaped configuration to be used as an office space. Reaching its final location in Pune, the container was integrated into the side to create an additional usable space. Reclaimed wood was used for access and openings, and the aluminum doors and windows are locally-sourced. Wall insulation was done with surplus nitrile rubber sourced from scrap dealers, while ceiling insulation was made from discarded thermocol/styrofoam packaging. Wall cladding was made from leftover cement fiber sheets and recycled chipboard. The flooring and seating was created from mixed-scrap reclaimed wood from the local timber market.

Fixed furniture, cupboards, doors and partition shelves in the bathroom were made from reclaimed packaging pinewood and plywood scrap. Loose furniture such as old chests, cupboards, center

tables were made from locally-sourced reclaimed material. A discarded metal drum was upcycled to create a sink and washbasin, while the bathroom door was made from an old door. Metal scrap such as gears and shower heads were used to make the handles, and discarded Jaisalmer stone used in the bedroom, kitchen and bathroom. A pattern on the bedroom floor was created out of the leftover uneven edges of each slab to avoid wastage.

Being a ready-to-install container, the joints were made specifically to sustain the rigorous movement to be experienced during the container's transportation on trucks and cranes on bumpy roads. Around 60 per cent of the materials were reclaimed and upcycled in the project, such its services, materials and fixing details. The firm also collaborated with scrap dealers, and incorporated alternative insulation solutions and paints to enhance the eco-friendly living experience.







# STUDIO SHED, PUNE

Studio Alternatives, Pune



with discarded mosaic tiles recycled from a museum dry-fitted to the flooring to minimize the use of concrete. Doors of the used shipping containers were repurposed to create secure main entry and exit points.

Desks, conference tables, chairs, cupboards and other storage spaces were upcycled from old furniture. Lighting fixtures were created using discarded reflectors and air circulation through repaired and repainted fans sourced from scrap, while décor items were made from upcycled lamps.

Apart from the main lighting, side skylights made from discarded toughened glass bring in light. A dry stone wall supports and retains the natural level difference inside the studio space, with old tires repurposed for a staircase. Pinewood pallets and fiberglass scrap were used to create partitions as well as water bodies in the shed. A container wall displays segregated discarded material, which acts as a material library.

A living wall with creepers on the south side and a green roof above the containers reduces heat gain and dissipates the noise of the rain on the metal roof. Paint buckets, bathrooms and discarded FRP molds double as planters as well.



## Design brief and aim

To upcycle a workspace.

## How this was accomplished

The firm designed the workspace to ensure 90 per cent use of reclaimed material, such as old shipping containers used as structural elements to form two sides of the shed. Small mild steel sections obtained from fabrication scrap were used in the construction, with bamboo for the roof structure to minimize the use of steel. Reclaimed doors and windows were enmeshed to create the other two walls of the structure,







# HOUSE IN THE FARM, ZAHEERABAD

Studio Inscape, Hyderabad

## Design brief and aim

To blend a traditional courtyard house within a linear layout.

## How this was accomplished

Designed for a couple, the lady wanted a traditional courtyard house with the rooms laid out around it, while her partner felt that a linear layout would be more functional. Therefore, the firm introduced a central connecting linear corridor and blended a courtyard house with a linear house.

The farmhouse is built around an existing tree in the farmland spread over 19 acres with a built-up area of 2,600 sq. ft. Designed around a visually-connected landscaped courtyard from all ends, the house complies with the linearity of the space.



Compressed stabilized earth blocks (CSEB) made of clay from the farmland, ergonomically-designed sill levels and multi-functional flexible furniture layouts comprise the design.

Bricks made on-site with excavated soil were used for flooring in the central courtyard, which also makes up the skin of the structure. Following the low-energy concept, the brick walls and form-finished slabs were left bare to blend with the surroundings. Lime-washed bedroom walls render a comfortable ambiance, with

tandoor flooring and black oxide skirting used for the interiors. Reclaimed wooden doors and windows, toggle switches with exposed conduits create an informal, economical and sustainable aspect.

The living spaces accommodate an L-shaped bench that serves as an informal interactive space, more befitting a farmhouse than a formal sofa set. Furniture in the common space is so planned to welcome both larger and smaller groups, by visually connecting them to the farmland outside.







# PADAL RESIDENCE, KAKINADA

Studio Inscape, Hyderabad

**Design brief and aim**  
To create an extension for a 250-year-old house.

**How this was accomplished**  
The client initially wanted to build a single room with verandahs on all four sides, while leaving behind the existing structure and creating a separate linear block to accommodate the extra bedrooms. This idea was changed to integrating the functional spaces into the existing verandahs and shifting the other spaces to the upper floor – allowing them to create extended spaces without increasing the overall footprint.



The wooden rafters of the sloped roof from the old structure are reused to create a flat roof for the extended sections. Mud blocks with lime finish are used for the walls, which allows a comfortable indoor environment in all weathers. The chances of termite attack are reduced as lime acts as a natural insecticide. Lime sandwiched between two terracotta tiles is used for the sloped roofs; being a natural insulator, it also cuts down on solar radiation offering no need for artificial air-conditioning.







The corridors were extended to cut down the height and open up the space adjacent to the ground-floor block, to make room for extracurricular activities. Oriented to the north-south direction, the build enjoys the full advantage of the northern light by using the linear windows on the top of the classroom walls. Existing roof trusses were reused by adjusting the angles and sizes, along with high ceilings.

Suitable materials were chosen so that local labor known for their skill in civil work could work on the structure. The firm worked with coarse rubble stone (CRS) masonry, which had been popular till the 1960s. It was used as the structural support for the new extended block and to support the roof in the linear corridor. Locally sourced from a quarry located 30 km away, CRS masonry renders a visual appeal as it acts like the skin of the structure. Athangudi tiles were used for the flooring, which brought down the layering costs. Terracotta were used for the roofs and common areas as it is readily available and possesses climatic and vernacular benefits.



# REV. JACOB MEMORIAL CHRISTIAN ARTS COLLEGE, TAMIL NADU

Studio Inscape, Hyderabad

## Design brief and aim

To redesign an existing arts college.

## How this was accomplished

Spread over 15,000 sq. ft., the project required the demolition and rebuilding of the college's roofs, corridors and pillars to make space for classrooms, administration rooms, and library. A double-height volume was created on the ground floor to accommodate the lobby and access to the library on the first floor. The new volume at the center of the linear block aimed to complete the existing structure, along with the addition of a main entrance into the block.







# BAREFOOT SCHOOL OF CRAFTS, GOA

unTAG Architecture and Interiors, Mumbai

## Design brief and aim

To construct an affordable, replicable and easily-buildable module for a school promoting local crafts.

## How this was accomplished

Envisioned as a composition of two linear pavilions, the school houses the classrooms/exhibits on one side and a large multipurpose space on the other side, the two separated by a green court and bamboo screens. They reflect the regional architectural style using native materials, local labor, traditional techniques and sensitization to the tropical climate. Apart from creating work opportunities for the local



workforce, the firm reinstates Goan art through architecture and simple replicable modular planning.

Bamboo screens with planters act as buffers against heat gain, which helps in the adaptable orientation of the platform. There are well-protected openings with large thatched roof overhangs. Locally-sourced laterite, bamboo, thatch and terrazyme mud floors with bamboo reinforcement make up the material palette. There is minimum use of glass, cement, concrete and aluminum with conventional construction techniques known to native craftsmen used. Minimum solid walls and plastered surfaces make up the linear pavilions with short-spanned structures.

Well-shaded and cross-ventilated spaces with large fenestrations ensure minimum electrical consumption during the day. There is a photovoltaic cell installation above the toilet block, with reed bed treatment for wastewater disposal from the toilets. Percolation pits with gravel beds in the landscape to recharge the water table levels. The pavilions are planned on a replicable cost-effective grid of 4.5 m, which enables adaptation to various site conditions and promotes cross-ventilation.





# A HOUSE IN A GAOTHAN, DAKIVALI

unTAG Architecture and Interiors, Mumbai

## Design brief and aim

To build a cost-effective home within the gaathan for a paddy farmer and a retired schoolteacher.

## How this was accomplished

Positioned on a 5,000 sq. ft. plot abutting the dusty kutchra (unpaved) village road, the site was once a wasteland with a small bamboo grove. Flanked on two sides by traditional village homes in a closely-knit farming community, the house had to be both participative and reclusive.

The farmer wanted his retirement home to be connected to nature yet be affordable.

Spread over 1,400 sq. ft., one enters through a traditional central courtyard (aangan). The courtyard with a young champa tree creates a comforting microclimate, and lowers the ambient temperature by three to five degrees Celsius. It is enclosed by a low-cost locally-sourced concrete fly ash-block jaali that acts as a buffer for dust and prevents direct visibility from the



village road. The jaali screen serves as a measure of climate control by blocking sunlight, while allowing the breeze to flow through it.

While ensuring the residents' privacy, the house has a road-facing entrance verandah on the west. Large, controlled openings establish a connection with the landscape, imbuing the compact indoor spaces with a feeling of spaciousness, through light and cross-ventilation. Multifunctional spaces optimize the floor plate, such as the double-height dining and pooja space that also serves as a library integrated with a metal staircase.

Wall surfaces, openings and projections are conceived through passive solar strategies to achieve optimum thermal comfort for the inhabitants and the terraces are painted white to reduce heat gain. Locally-manufactured concrete fly ash blocks, plastered walls and Indian kota stone foster economic and ecological sustainability. Recharge pits at key locations channelize the rainwater run-off into the ground, and wastewater is treated through phytoremediation (using living plants to clean up contaminated soil and water) and used for landscaping.



photography :: untag architecture & interiors





bedroom merge into a single space during the day, which gives the sense of a larger modular living area.

The entry is through a see-through vestibule that connects the main house to the kitchen. In the kitchen, there is a service court for the chullah, enclosed by a stone jaali that shades the court. The house gradually steps down, following the site topography, culminating at a 14-inch ridged verandah that offers sunset views behind the distant mountains.

Laterite procured from a quarry three kilometers away comprised the load-bearing structural element that made up the body of the house. Porous laterite was laid using lime and cement mortar that behaves like earthenware and keeps the internal temperature at four or five degrees Celsius lower than the outdoors in the summer and withstands the westerly monsoon. Locally-available terracotta roof tiles supported on a sloping, metal roof structure provide shade, while salvaged local teak and jackfruit wood was bought at a nominal price, by reusing the rafters of a dismantled temple from a nearby village.

Indian kota stone adds another layer of heat insulation to the floor and internal walls from the scorching sun. The client's old unused furniture was altered and reused for the living room, maintaining a balance between local materials and the reuse of existing assets.



# VRINDAVAN, SINDHUDURG

unTAG Architecture and Interiors, Mumbai

## Design brief and aim

To conceptualize an indigenous and cost-effective retirement home for a retired couple.

## How this was accomplished

Spread over 1,000 sq. ft., the farmhouse is nestled within a 2.5-acre farm nurtured by the clients themselves for over 15 years with mango, jackfruit, palms, chikoo and cashew plantations. The firm found a dead mango tree on their first site visit, and the house was planned there - surrounded by a dense grove and a hillock view in the distance.

Designed as a series of 12-inch-wide descending spaces, the project begins with the bedroom and bath space, leading to a cross-ventilated living space and verandah trailed by an open deck overlooking the hillock. The living room and private



photography :: gauri satam and telesh patil





# STONE X, KISHANGARH

Urbanscape Architects, New Delhi

## Design brief and aim

To conceptualize an administrative and industrial complex for a marble supplying factory.

## How this was accomplished

Instead of erecting an impersonal factory-processed industrial shed that focuses on the product, the factory was developed as a native production house, and was inspired by the regional Sonpura temple. Keeping in mind the worker who inhabits the stone processing factory under harsh working conditions, the production unit is designed to have a comfortable ambience throughout the day.

The skin of the office building was sandwiched between two laminam panels to further insulate the interiors. An enveloping stone screen was fabricated using the stone waste from a nearby quarry and onsite, which provides solar shading. A playful light-and-shadow effect was created, thanks to interwoven stone blocks that appear to be floating at different levels.

The site accommodates maximum built-up area and is oriented in the east-west direction, along with north light trusses and optimum solar roof. Vehicular access is restricted to one side to ensure low pollution levels and efficient movement.

Facilitating climate-responsiveness, earth berming and earth coupling ensures a partly-sunken mass that responds to the hot and dry Rajasthani climate. Radiant cooling allows for a 60 per cent efficiency in the running costs, which has resulted in cutting HVAC load by 40 percent. Floors are radiantly cooled to regulate temperatures.

The stone façade bears strength and fluidity, and the buttress was used to hold the structure together. A double-glazed structural glazing system and insulated aluminum panels comprise the exterior face, which complements the rubble façade. Factory waste such as stone slate was fixed with SS rods and spacers to provide shade for the office façade.

The processing plant and display area are well-insulated using local rubble walls of 550 mm thickness towards the eastern façade and insulated galvalume sheet in the triangular-shaped flutters with a blank façade towards the west. Glazing and louvers at the lower level connect the viewer visually with the landscaped surroundings, while the louvers and glazing towards the northern light develop a wind draft to release the warm air and bring in the light. Local rubble masonry which involved local craftsmen, facilitates the passive design to optimize the climatic conditions.

North light trusses were introduced to penetrate the entire volume sloping at an angle of 23 degrees towards the south, which provides space for photovoltaic panels and a solar roof of almost 1MW. Long concrete gutters avoid water leakage and facilitate maintenance.

Green cover, soft scaping and bio STPs recycle wastewater for landscaping and toilets. The firm installed a hundred per cent rainwater harvesting process that keeps the groundwater table recharged and cools the facility. The office was sunk into the ground, away from the existing row of trees, and the irregular-shaped courtyards avoid damage to the roots of the existing trees. The mass was punctured to create sunken courtyards and an amphitheater within the earth-cooled lower floor. A silhouette adorned by stone screens and greenery climbs up the roof while the roof wraps around the ground and merges into the landscape to maintain temperatures.





# CANTILEVER HOUSE, GHAZIABAD

Zero Energy Design Lab, New Delhi

## Design brief and aim

To construct a contemporary, energy-efficient and sustainable home measuring 830 sq. m. that explores regional vernacular architecture.

## How this was accomplished

The name is derived from the large cantilevers, which anchor its design vocabulary, highlight the scale of the building and focus on horizontality. The primary challenge was to design the frame with judicious use of steel for economic viability. Privacy was paramount, while channeling an open and connected environment, where the main living spaces occupy the ground floor and the private areas are located on the first floor.

Similarly, the cantilever slabs span the verandah, rendering a modern aesthetic while creating shaded spaces underneath. The geometry of the cantilevered forms results in fluid and interwoven spaces. One enters through the double-height lobby on the east-facing entrance porch, leading to a garden with a water body. There are green areas in the interior spaces, which establish a strong visual connection with the landscape.

The lobby is flanked by the summer court on the north and winter court on the south to enable stack ventilation at all times. The night-time spaces are characterized by optimum thermal mass to protect the



daytime spaces from the south and west sun. The northern face of the house is glazed to admit diffused daylight and avoid heat gain and glare.

The front elevation on the east features expansive projections, and the master bedroom on the first floor is designed as a cantilevered block. It juts out over the landscaped garden, and ample light flows in through a large opening that offers stunning views of the front lawn. Passive cooling techniques and renewable energy resources emphasize responsible living in the hot and dry climate. The façade is fitted with double-glazed units

with low-E coating for thermal resistance, and the glazing for the day-time spaces opens out into the water court.

The integration of the landscape with the residential structure ensures a cool micro-climate for the residents. The water court on the north serves as a heat sink, and the vertical gardens purify the air, trap dust and pollutants and maintain thermal comfort. The front and rear lawns along with the water court serve as recharge pits for rainwater harvesting, and evacuated solar hot water systems were installed on the rooftop for hot water.



photography :: andre j. fanthome

FOCUS



# MATERIAL MATTERS IN SUSTAINABLE PRODUCTION

in an ironic twist of events, india is re-learning environmentally conscious design practices. suppliers try to walk the fine line between doing the right thing and paying the bills. the good news is that their numbers are rising.

## The environmentally conscious design

movement has gained momentum in recent years as more brands offer a range of eco-friendly products that have been created with a holistic approach to reduce the negative impact on the environment. "Sustainable products will translate to longer lifespans and less deterioration of resources," says Amit Shah, Managing Director, Classic Marble Company, Mumbai, India. "The impact on the environment will gradually decrease and the rate at which we consume will also come down drastically."

the rug republic | delhi

A drive to stop overusing resources is a major factor with many companies offering sustainable solutions. "I used to work as a fashion buyer for a couple of years and realized how wasteful the retail industry is; producing cheap products that don't last and that are meant to be thrown away after a couple uses/months, trends that exist to make customers buy more, underpaid workers with bad working conditions, product transportation (making products in Asia to sell in America), the culture of disposable, plastic packaging, inventory surplus that

are thrown away or burned," says Virginie Clusiaux, Co-Founder, Itemerie, San Francisco, United States. "I've soon realized that this situation is unsustainable. I wanted to be a part of the solution, not the problem."

While doing market research, Parikshit Borkotoky, Managing Director, Kraftinn Home Décor India Private Limited, Assam, India, discovered "consumer products form 40% of the non-biodegradable products and a substantial part of the remaining comes from industries producing those products."



priestman goode | london



the yellow dwelling | bangalore

wallistry | chennai



the second wind | gurgaon

## eco-friendly materials

Working with natural materials to produce a quality product is not just good for the home, but is beneficial to the environment.

"Early in our career, we understood that as designers, we have a responsibility, driven by the acknowledgement that 80% of a product's environmental impact is already determined at the drawing table," says James Dart, Co-founder, OnMateria, Sweden. "Our approach goes beyond choosing a sustainable material to apply on our latest design, but rather it is a critical exercise where we try to understand the repercussions of what we are designing. This continuous process brings us to a deeper understanding of the material and helps us choose how to use resources wisely," he adds.

Linen, for instance, is a fast-growing and renewable resource. "As a crop, it's good for the agro-industry and the soil in which it grows. We are able to see so many advantages to use this textile that has less water consumption and a smaller carbon footprint than cotton or synthetics, and also a positive end-of-life prospect," says Dart. Adding "Our developments with this material also see it as a future material, able to replace carbon fibre composites for sports equipment, transport, and products in the home."



classic marble company | mumbai



adriano di marti sa de cv - guadalajara | mexico







sadaya guild | mumbai

Asif Rahman, CEO, Insigne Carpets Pvt Ltd, Haryana, India says the output of products made with natural fibres like pure wool, jute, hemp, cotton and sisal, “create better indoor air quality and ensure Earth’s biosphere and hemisphere is not damaged during the production process.” Abhinayah Sundaramoorthy, Co-Founder, The Yellow Dwelling, Bangalore, India, adds, “By using natural fibres in your home furnishings, you’re eliminating the possibility of even one microplastic particle from entering into your home.”

Plant-based products are the best material choice while creating natural fiber. “These green fibers are easy to replenish and not hard on the environment as they are biodegradable,” adds Shibani Dasgupta Jain, CEO and Founder, Baaya Design, Mumbai, India, who uses jute and other natural fibers.

Bamboo is the gold standard in sustainable material. “It’s among the fastest-growing plants with properties like high compressive strength, tensile strength and flexural strength. Apart from the aesthetics, it can be a great alternative to non-sustainable alternatives,” says Borkotoky. “Products made out of bamboo will last for years and can be composted,” says Clusiault. “Also, it is soft yet solid and resistant as a material.”

Less common alternatives like water hyacinth, a highly invasive plant, can be used to weave a range of products, like yoga mats, carpets, and bags. “It has to be removed regularly where it grows as it has the potential to reduce the oxygen level of water

while decaying, thereby creating an imbalance to the ecosystem,” says Borkotoky. Marte Arturo Cazarez Duarte and Adrian Lopez Arriaga Lopez Velarde, Co-Founders, Adriano Di Marti Sa De Cv, Guadalajara, Mexico, discovered that cactus complies with the most rigorous quality and environmental standards of the industry without the necessity of killing animals or using toxic plastics to make vegan leather products. “Thanks to its natural hygroscopic mechanism it only needs an average of 200 litres of water without using chemicals or fertilizers to create 1kg of biomass, which is absorbed by the plant itself without irrigation,” says Duarte. Adding, “In contrast, most plants in the world need an average of 1000 liters to create the same kilogram of biomass, never mind the use of toxic chemicals at cultivations.”



sarthak sahil design co | delhi



itemerie | san francisco



on materia | sweden



baaya design | mumbai



woometry - sta iria de azóia | portugal



wonky works | gujarat

## recycle, reuse, renew

Reusing and repurposing discarded objects and materials has been a big initiative for many upcycling businesses like The Second Wind based in Gurgaon, India. It was co-founded by Ira Maurya, who was inspired to start the business after finding it difficult to find resources to create furniture from discarded materials while setting up her home. “Rather than buying new lumber, we scored old furniture, tyres, other discarded materials and turned them into beautiful functional pieces for our space,” says Maurya.

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kraftinn home décor india private limited | assam



wallistry | chennai



the yellow dwelling | bangalore

Ekta Doctor, Founder, Wonky Works, Gujarat, India, has made it her mission to keep reusable materials like glass out of the landfill and instead use them to create long-lasting and well-designed products. “The heat needed to melt our upcycled glass pieces is very high. However, that is still about 40-50 per cent less than what would be needed to make fresh glass,” says Doctor. This process, she says, is extremely beneficial to the environment as it uses less energy and reduces greenhouse gas emissions, as well as air and water pollution.

Plastic is the designated demon of sustainability. Raghav Gupta, Director of E-Commerce, The Rug Republic (TRR), Delhi, India agrees plastic is among the worst environmental hazards. To reduce its usage and impact on the environment, the company uses recycled water bottles and bicycle tubes to make their ‘Zambezi’ rug. “Even while being responsible towards the environment, there is no compromise on quality or style of the products,” says Gupta.

“We understand that there are many more levels to reach with new qualities of plastic, and we also have to deal with useful and existing ones that are harder to transform when they become waste,” says Dart. OnMateria’s Green Box, a hotel amenity kit made of post-industrial biosource PLA waste, natural pigments, agro-waste wheat fibre is a result of that need. “We wanted to be thorough and critical about the material profile. It was crucial that the injection moulded plastic fit a challenging requirement,” says Dart. It had to be certified for industrial composting, and soil fertilizing – the outcome of biogas production.

sodo - sopa | sydney





For Andrew Le, Co-Founder and Designer, SODO – SOPA, Sydney, Australia, reducing consumers' impact by reusing existing materials can also contribute to the circular economy and reduce carbon emissions. Broadleaf, a three-legged chair made from circular plastic, Le says was created to “raise awareness about the importance of recycling and contributing towards a circular design economy.”

Used cardboard boxes that would otherwise end up in landfills or oceans are also being given new life. "A common shipping material often used by electronic companies to protect products, thick, corrugated cardboard boxes don't get recycled nearly as much as they should due to size and weight," says Le. "Even worse, as certain types of cardboard decompose, they can generate methane, a greenhouse gas that pollutes the environment."

This inspired the design of the Serif + Sero furniture set made completely out of upcycled cardboard that is modular and customizable to promote waste repurposing.

As a way to minimize its ecological footprint and CO2 emissions, objects made by Woometry are made of 100% recycled wood. "Lots of people throw away furniture and door frames without understanding its potential," says Kate Bombony, Co-Founder, Woometry, Sta Iria de Azóia, Portugal. "The little waste we produce gets sorted out for recycling. We even use the leftovers from bigger projects to create smaller objects such as hangers and logos," adds Mike Beck, Co-Founder, Woometry.



the second wind | gurgaon

Sadaya Guild has gone a step further with their sustainable goals and found a way to make something useful out of waste material like magnets from hard drives. "They now make up 100% of the magnets we use in our products, especially the knife and tool holder, that was specifically designed to use the e-waste magnets," says Sohail Rekhy, Sadaya Guild, Mumbai, India. Adding, "These super strong magnets are now not only lessening the load on our landfills but also the pockets of our clients."

priestman goode | london



classic marble company | mumbai



sadaya guild | mumbai

adriano di marti sa de cv - guadalajara | mexico



onmateria | sweden

## handmade

Investing more in the crafts sector offers a wide scope to improve environmental and social conditions across the globe. "Handmade products are a true example of sustainability as they are based on usage of traditional skills, judicious use of materials and practices that have survived across the ages," says Jain. "Most of the sustainable development goals listed by the United Nations can be potentially achieved by better usage of these traditional crafts," she adds.

The activity of handcrafting creates a strong bond between the creator and the product, says Jain. "When a craftsman uses the wax threads to make the mould of a Dhokra product, the sense of touch is enhanced. He can see the creation taking form and almost sense the texture of wax and wet mud that he shaped. This deep relationship helps the artisan to act more responsibly," she explains.

Clusialt whose products are ethically made by artisans in Canada, USA, Europe, Vietnam and Mexico agrees. "They (artisans) want their products to last decades so they use high-quality materials that are locally and ethically sourced and they use materials that have a low environmental cost."

Ensuring the craftsmen are given a fair price for their time, labour and skill is a high priority. "Our ethics lies in enhancing and nurturing the way the artisans contribute to this sustainable lifestyle," says Anjanakshi Baskaren, Co-founder, Wallistry, Chennai, India. Wallistry's wood products are intentionally made from fast-growing acacia trees. "This helps the local wood craftsmen from Tamil Nadu to craft various products to sustain their small businesses ethically, without affecting the tree count," adds Soundaryan Umapathy, Co-founder, Wallistry.



baaya design | mumbai

sarthak sahil design co | delhi



woometry - sta iria de azóia | portugal



the rug republic | delhi

## technology

New technologies are offering solutions to better create sustainable products with ease and efficiency without further damaging the environment. "We have a keen interest in new processes (light induction tooling) for creating natural fibre composite products and injection moulding," says Dart. "We can now use sustainable thermoplastics to replace toxic thermoset resin or solvent glues found in products for sport, transport, and the home. He further explains: "Rapid heating and cooling of mould tooling is achievable at a speed and scale that make new concepts viable in cost. It gives us access to higher volume production with new sustainable materials and quality in mind."

The textile industry is notorious for polluting the environment. According to the Natural Resources Defense Council (NRDC), textile mills are responsible for one-fifth of the world's industrial water pollution. Dyes used to colour fabric is one of the major contributors to pollution. However, new inventions are helping curb this issue. "The latest advancements in printing machines along with new water-based dyes have vastly reduced the negative impacts this industry has previously had on the environment," says Nanda Kumar, Co-Founder, The Yellow Dwelling.



challenges

The sustainable products industry is still in its nascent stage there are challenges that have yet to be addressed. “There are not many supporting industries to help us create the best quality products and experience,” says Borkotoky. “We need greater access to tools and machinery specially developed for working with materials like bamboo,” he adds.

For some designers, developing environmentally products is a challenge when better value chains are not yet in place. “While concepts may be realistic in terms of what is physically possible to produce, manufacturers may not yet have systems in place to deliver a holistic product,” says Dart.

Consumer awareness about the concept of upcycling and the organic nature of handcrafts is fairly low and often misconstrued. “What now looks like a beautiful incense holder, could have been a door or a wardrobe in someone's house and previously it was a tree. People often are not able to see past the object and acknowledge all the work that was

necessary to produce to be able to achieve that result. That’s an educational challenge that needs to be addressed,” says Mike Beck, Co-Founder, Woometry.

More needs to be done for the craft industry to prevent it from disappearing. "The craft industry still faces a big threat from automated processes that copy their designs and offer similar products at lower prices,” says Jain. "Japan has successfully created awareness of ‘Wabi Sabi’, that of taking delight in the innate ‘imperfections’ of the hand,” she adds.



the yellow dwelling | bangalore



wonky works| gujarat



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high price

Sustainable products tend to cost more because various components go into making them. “The key elements that affect the pricing of crafting sustainable products are the process, quality of the materials used, and the craft technique employed,” says Jain.

Baskaren adds: “Sustainable materials, cost more to be procured/grown and it takes more time to be made. Transportation costs of the end product in terms of weight and care (considering fragile nature of materials), play a significant role in determining the end pricing of the product.”

The amount of labour also adds a certain premium to the pricing. “The artisans who transform the products are remunerated ethically and devote ethical work hours to the process,” says Sahil Bagga, Director and Co-Founder, Sarthak Sahil Design Co, Delhi, India.

The price point for such products can be a barrier for end consumers and manufacturers. “For the latter, however, it’s important to look at the whole lifecycle of a product. If you take packaging, for instance, it may be that sustainable packaging has a slightly higher price point than plastic for example,” says

Maria Kafel-Bentkowska, Head of CMF, PriestmanGoode London, United Kingdom. Adding, "But the business might make cost savings elsewhere in its manufacturing process as a result of working with more sustainable materials."

Currently, there is no avenue provided by the government that could facilitate these businesses' sustainability model or make them more competitive. “Even simple tax-exemptions are unavailable,” says Rekhy.

trends

Clusiault predicts the most popular sustainable products will be those that replace single-use plastics, like toothpaste tablets, bulk bags, biodegradable toothbrushes, reusable bags, reusable bottles, straws, and silicone mats. "Single-use plastic is a huge problem and businesses start finding ways to replace and make it easy for consumers to switch to reusable products," she says.

Kafel-Bentkowska says products made with wasted materials, especially food waste, could gain popularity." There is a growing movement towards circular design, looking at the whole lifecycle of a product, to ensure there is zero waste," she says.







the rug republic | delhi



classic marble company | mumbai



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the yellow dwelling | bangalore



sodo - sofa | sydney



baaya design | mumbai



sarthak sahil design co | delhi

## growing market

Climate change concerns and the coronavirus pandemic have caused a shift in thinking in consumers, who are becoming environmentally conscious about their impact on the planet. This has helped the sustainable products market to grow steadily over the last few years.

"As per our survey, the demand for sustainable products with economic viability has grown 5 times more than their non-sustainable counterparts," says Borkotoky. Since 2015, his company has been able to register a growth of above 90% CAGR and expects to see it grow

about 150% CAGR in the next 5 years. The Rug Republic's growth rate is around 20 per cent year-on-year. Meanwhile, Sarthak Sahil Design Co has on average had a 30 % year over year growth rate since its inception in 2010.

Developing products in the framework of a project can be a useful way to present a sustainable lifestyle holistically, according to Sarthak Sengupta, Director and Co-Founder, Sarthak Sahil Design Co.

"This way we can create an entire experience with greater effect than isolated products and sustainable products can transcend from being a novelty to being a lifestyle," he says.



sadaya guild | mumbai



## future

The future of our planet, Rahman says, will determine the future of sustainable products. "We cannot do unlimited development with limited resource," he explains.

Bagga believes companies want to explore and forge partnerships "at the grass-root level, marry craft with technology, and re-contextualize the use of organic materials that do not add to the landfill."

Gupta hopes governments across the globe focus on promoting industries and companies that are serious about sustainability to see it grow. "Things like tax breaks help companies to adopt even more expensive technologies that may be even better for the environment," he says.

Together, by using sustainable materials and adopting ethical practices, Duarte believes we can build a better world. "The pandemic came as a reminder that we are running out of time and that comprehensive care of the environment is the responsibility of us all." ॥



# BIODIVERSITY BY THE BAY- A CELEBRATION

mumbai artists and performers come together for a special cause  
— to raise awareness on climate change

## Hosted between November 5 to 25,

the 'Biodiversity By The Bay' festival saw a host of artists, musicians, comedians and designers perform together to raise awareness around climate issues and celebrate Mumbai's diverse ecosystem.

The festival was split into three sections - music, art and comedy – with performances by Parekh + Singh, Anushka Manchanda, Blot!, Kunal Rao, José Covaco and Daniel Fernandes - who all performed live on their social media channels.

In addition, a host of designers and artists produced new work which was shown across social media, including Priyanka Paul who released a beautiful and moving illustration picturing the Koli fishing community who have been adversely affected by coastal developments,

industrial fishing and now the Covid-19 pandemic. Talking about the project on her Instagram, Priyanka said, "Mumbai stands at a critical point in its history. Our rich ecosystems and unique biodiversity are under threat from unsustainable planning and rapidly growing emissions. Without nature, we cannot survive. Conserving our environment cannot just be a

global conversation, it has to be one that starts at a local level."

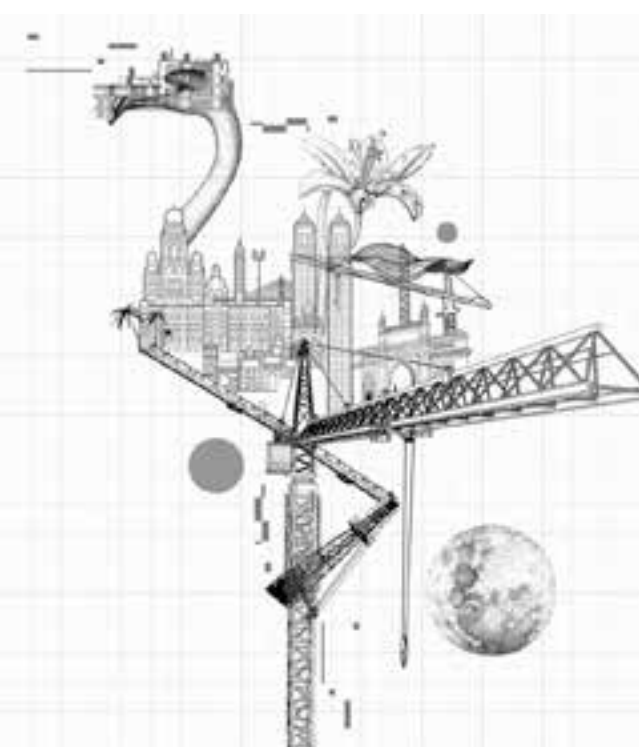
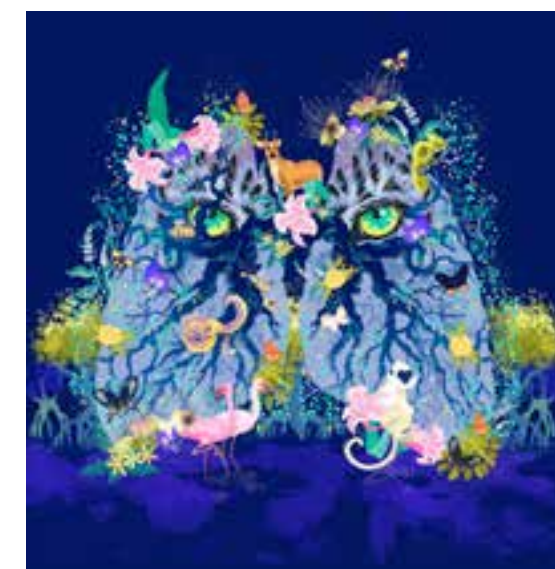
Other artists put together works showing the challenges and struggles to preserve a balance with nature, while others produced works that celebrated Mumbai's ecosystem. Pia Alize showcased an illustration that brought together many of the animals and plants

that make up Mumbai's environment including peacocks, deer, hibiscus flowers, crabs and butterflies as a celebration of everything that makes up Mumbai. Similarly, Shweta Malhotra used her bold graphic style to depict a flamingo as a symbol for Mumbaikers to understand the need to protect what they can.

Organised by Dead Ant and Ministry of Mumbai's Magic, the festival was accompanied by a list of demands that were presented to civic bodies and policy makers within the government of Maharashtra.

Speaking about the festival, Ravina, the Founder & Editor, DeadAnt, said, "We've reached almost a million people already, and are thrilled to see audiences engaging in important conversations about the need to protect and preserve Mumbai's biodiversity through some of India's most exciting young artists in comedy, art and design."

A spokesperson from Ministry of Mumbai's Magic summed up, "The campaign will be working to showcase the work we have done so far, from public consultations about Mumbai's parks, to a video series on the indigenous youth of Mumbai, in order to grow our community and broaden the conversation on biodiversity, but we will also be exploring opportunities to engage with decision makers at the BMC and the Ministry of Environment to find new ways to create policy impact."





# REUSE RECYCLE REMAKE

An AHEC collaboration with five Indian furniture designers launches a line of stunning design.



**In a first design collaboration** of its sort in India, The American Hardwood Export Council (AHEC), the leading international trade association for the American hardwood industry, has announced the launch of 'REMAKE'. The project challenges the five leading Indian furniture designers to each select three pieces from their existing furniture range and to remake them using American hardwoods. This is the first design collaboration by AHEC involving Indian designers and it builds on prior initiatives, which have aimed at creatively promoting American hardwoods.



REMAKE was conceived as a response to the need for hands-on experience with American hardwoods in India's furniture manufacturing sector. The designers involved with the project include Studio Wood, Bram Woodcrafting Studio, Kam Ce Kam, Esvee Atelier and Studio SFDW. In response to the brief, the designers have been asked to choose three of their own existing pieces and remake them using American red oak, white oak, cherry, hard maple, tulipwood or hickory. AHEC will supply all the lumber for the project from a stock of American hardwood species held in India, which was donated to AHEC by Allegheny Wood Products.







# SILENT SPACE

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