

# Sustainable Consumption Cultures, Practices & Lifestyles in India



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# Preface



*“A sustainable lifestyle means rethinking our ways of living, how we buy and how we organize our everyday life. It is also about altering how we socialize, exchange, share, educate and build identities. It means transforming our societies and living in harmony with our natural environment. As citizens, at home and at work, many of our choices – on energy use, transport, food, waste, communication and solidarity – contribute towards building sustainable lifestyles.”<sup>1</sup>*

A circular economy is an alternative to a traditional linear economy (make, use, dispose). Looking beyond the current “take, make and dispose” extractive development and economic model, the circular economy is restorative and regenerative by design. Relying on system-wide innovation, it aims to redefine products and services to design waste out, while minimising negative impacts.

The environmental consequences of unsustainable lifestyles and patterns of production and consumption are now widely acknowledged. Unsustainable consumption leads to pressure on natural resources and long-term impacts on the environment. While a section of the globe and the society faces a lack of basic necessities, the high consuming and unsustainable lifestyles of another section places immense stress on the environment. This imbalance in global consumption patterns is reflected in a situation where the richer sections over exploit the available resources and the poorer segments are unable to even meet their food, health, housing and educational needs.

In India, traditional practices that are sustainable and environment-friendly continue to be a part of people’s lives. India has a history of low carbon footprint and lifestyle. These need to be encouraged, rather than replaced by more modern but unsustainable practices and technologies. This is also applicable to other developing countries where there is a growing interest in alternative models of development, and on reviving green consciousness drawing on traditional cultures<sup>2</sup>.

This documentation of Case Studies on Sustainable Consumption Cultures, Practices and Lifestyles from different States, Regions, Cultures and Lifestyles in India was a dedicated effort to bring forth the cases on diverse subjects, which have the potential to contribute massively towards Sustainable Development and push for a

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<sup>1</sup> Report of the Marrakech Task Force on Sustainable Lifestyles led by the United Nations Environment Programme (UNEP) and the United Nations Department of Economic and Social Affairs (UN-DESA)

<sup>2</sup> Climate Friendly Lifestyles Practices in India, Ministry of Environment, Forests and Climate Change, Government of India.

more responsible model of circular economy. The report compiles the case studies of 15 modern practices, which are either inspired by traditional knowledge and practices or is a conscious effort by socially responsible citizens of India to 'Be the change they want to see in the World'.

There are many friends to whom we would like to extend our sincere thanks of gratitude starting with Swedish Society for Nature Conservation (SSNC), especially to Sara Nilsson and Alexander Sjöberg for their valuable partnership and unrelenting support for successful completion of this project. The cases were compiled on the basis of field visits and interaction with innovative minds behind the fabulous ideas. We would not miss the opportunity to make them partners in our happiness and thanking them for their time and patience to provide us with all the relevant details of their work and inputs on the subject.

We would like to thank T.V. Anupama (District Collector, Alappuzha), George C Varughese (President) and team at Development Alternatives; Deependra Prasad, Green Building Consultant for Indira Paryavarjan Bhavan; Architect Eugene Pandala; Architect G. Shankar; Smt. Binz C Thomas (District Coordinator, Kerala Suchitwa Mission), Priyanka and Pranav Mokshmar, (Founders) and Vaayu Team; Mansukhbhai Prajapati (Founder), Ravi Prajapati, Raj Prajapati and Mitticool team; Arvindbhai Patel (Founder), Jaymeen Patel & Notion Technocrats India team; C. Sekar, President Jute Weavers Association, Chennai and team; Rakesh (Owner) and Deepam Palm Dish team, Kerala; Jaydeep Mandal (Founder) and Aakar Innovations team; Jayshree Industries, Coimbatore; Kamlesh Salam, Founder-World Bamboo Day; Saurav Saikia (Business Development Manager), ESES Bio-Wealth Pvt. Ltd; Abhinav Kant (Director) Bamboo and Cane Development Institute; Naveen Sood (Proprietor) CaneCraft & Allied Industries; Sunuraj N, Business Manager, Coir Craft; Anil Joshi and HESCO team; Harish RP, Research Associate, Ashoka Trust for Research in Ecology and the Environment, Shailaja Rangarajan and Rimagine team; Vijay Krishnan and all volunteers of Thuli; Vasantha Gopalan, Founder and all volunteers of Kanika; Srishti Arora Anand, Jyotika Bhambri, Rashmi Arora and Wedding Bells team. The study greatly benefitted from these innovative teams who readily agreed for a one-on-one meeting with the CUTS team to provide an in-depth knowledge on their sustainable venture and later providing continued guidance and support for the study.

There are many more people we met during our research and travel who provided valuable suggestions and inputs for the study thereby guiding us directly and indirectly to have a better understanding of the cases. We would like to extend our most sincere gratitude and appreciation for their time and positive response.

In the end, we would like to thank and express our sincere gratitude to all outside and within the organisation, especially to my colleagues Aakansha Choudhary and Simi T.B., who did the research along with me, and did the whole documentation. I also thank my colleagues Deepak Saxena, Madhu Sudan Sharma, Satyapal Singh, Jeetali Agnani and Kunwar Dheer Singh for support at various stages such as inputs in finalising the research tools/format for documentation and gathering information of some of the cases, and whole CUTS CART team for their valuable inputs time and again. We also thank many other friends, who helped in identifying the appropriate cases.

Hope this study will help in propagating the traditional practices in India to the wider world and also regaining and retaining those practices.

August, 2018

**George Cherian**  
Director, CUTS International

# Introduction

Talking about Sustainable Development, the first thought that comes to our mind is Environment Protection. But the concept of interrelatedness, of a shared planet, and of global citizenship cannot be restricted to environmental issues alone but apply to interlinked responsibilities of environment protection and human development. The Sustainable Development Goals (SDGs), which came into effect in 2016 and their respective targets present a holistic understanding of the term “Sustainable” for the world where there is no poverty, no hunger, and no discrimination along with protection of the planet. Since then, the world is talking about sustainable development and to achieve the goals, the concept of ‘Circular Economies’ is being pushed.

Circular Economy is seen as an alternative to traditional linear economy based on the principle of ‘make, use and dispose’. In India, the traditional concept has always been the circular economy, where resources are used as long as possible, extracting optimum value followed by recovery and regeneration of products and materials at the end of each service life. But with the advent of Industrial Revolution in Britain, the situation in India changed drastically with respect to traditional and cultural practices in particular. The country, which believed in sustainable development, somewhere lost its track before independence due to getting exploited by the British; and influence of market forces, Industrialisation, Capitalism, Globalisation and most importantly to gain the tag of “Developed Nation” post-independence.

India has gone through many changes and has been on a path of development that also bears its influence on the culture, however, the belief and exposure of the people to traditional practices and ideas, albeit limited, is not entirely extinct. Some of these ways, means, ideas and traditional practices have influenced the modern practices and have resulted in coming up with innovative ways for a new sustainable world with space to accommodate all.

Most of these techniques and innovative ideas are either hidden in remote areas or have not gained exposure due to their local nature. These practices can serve not only to protect the environment but also to deal with issues of poverty, inequality, gender discrimination and build a just society. This project is, therefore, an attempt to identify cases on Sustainable Cultures, Practices and Lifestyles in India, which are either at local level or are social ventures and have potential of replication on a larger platform at an urban level in relation to the concept of Sustainable Culture and Circular Economy.



# Sustainable Marvels from Mud

According to the United Nations Framework Convention on Climate Change (UNFCCC), cement industry alone accounts for 5-6 per cent of global emissions. At one end, unsustainable structures are not only destroying the green landscapes but also significantly responsible for global warming on the other, architects like Eugene and Shankar from Kerala have trusted the traditional technique of mud with a blend of technology to build Sustainable Habitats.



## Bodhi, Quilon, Kerala

'Bodhi' is a traditional mud house thoughtfully designed by Architect Eugene Pandala known for his environmentally sustainable designs. The house constructed in 1996 is made entirely with clay rich mud procured locally and then stabilised with 5 per cent cement content. Cobs or globs of mud were used to build the walls manually with the help of local labourers tapping their traditional skills. The use of light weight and malleable ferro-cement for roof puts relatively less weight on the side walls and foundation, making the structure strong and durable. The old and rejected tiles from neighbourhood were brought in to come up with well thought out floor designs. There are fans in the rooms, but no air-conditioners as the mud architecture and effective stack and cross ventilations ensure that temperatures are regulated naturally, saving on huge electricity cost. Even the storage racks, bed, television and telephone stand, table and small stools are made of clay and blends well with the structure.

## Siddhartha, Trivandrum, Kerala

Imagine what happens when an architect gets on to work without a building plan and pledged to work just with the natural and locally available materials. Architect G. Shankar's residence 'Siddhartha' is a beautiful result of risk he took following the gut feeling of an architect within him. There was no planned or pre-planned structure and everything happened on a daily basis with 'new day, new idea' concept. The exclusive use of mud is based on his belief – "Human life is from the soil and back to the soil".

The house is built using adobe bricks made of a mixture of earth and water using moulds of metal or timber. The proportion of sand and clay is fixed at 80:20, as too much clay may cause adobe to crack. Everything from roof to walls to ceiling is made using mud as the principle ingredient. Stone lintels are provided in the form of one single piece, with roofs thatched with coconut shells and bamboo. Use of recycled wood from old buildings to fix windows,



doors and furniture justify the principle of circular economy in his designs. The natural elements (wind, water, sunlight) are effectively used to enhance comfort and transform the house into a pleasant and relaxing environment.

# Low-cost and Compostable Sanitary Napkins

According to National Family Health Survey (NFHS) IV, as many as 62 per cent young women in India in the age group of 15 to 24 years, still use cloth for menstrual protection. The usage of sanitary napkins in rural India is just 48 per cent while at the urban level it is 78 per cent. There are many socio-economic factors, which have restricted the penetration of sanitary products. The increasing burden of sanitary waste in solid waste management along with safety concerns related to these chemical-based products have also attracted attention to the issue.

## Aakar Innovations

Aakar is a hybrid social enterprise comprised of Aakar Innovations and Aakar Social Ventures, started by Jaydeep Mandal and his team that enables women to produce and distribute affordable, high-quality, 100 per cent compostable and, low cost sanitary napkins, within their communities while simultaneously raising awareness and sensitisation of menstrual hygiene management. The sanitary napkins produced by unit setup by Aakar have a common name



and are popularly known as 'Anandi' pads. Beyond the obvious health benefits, there are huge positive outcomes with respect to livelihood and women empowerment. The enterprise works on community owned model employing only women, leading to local employment generation, skill development and increase in disposable income for women. The primary focus is on increasing community knowledge, changing attitudes, behaviours and practice towards better menstrual health and hygiene by creating 'change-agents' within the community. The enterprise sets up small enterprises run by women from marginalised communities in a manner that is sustainable over the long run and provides dignity and hygiene to women in the neighbourhood.

The 'Anandi' pads are fully compostable made from natural raw material, which takes 6-12 months to decompose; thus hitting head on to the menace of sanitary waste adding to the landfills. The pads do not use Super Absorbent Polymers (SAP) like other readily available alternatives in the market known for their side effects like Urinary Tract Infections (UTIs).

# Green use of Brown Coir-Coir Industry of India

As per 2017 statistics, India is leading in the global coconut production as well as productivity and more than 10 million populations depend on coconut cultivation for their livelihood. The huge production of coconut has also made India one of the largest coir industries in the world making its mark since 19<sup>th</sup> century. Coir fibre extracted from coconut husk is one of the versatile products of a coconut tree. Naturally blessed with the highest concentrations of lignin, a natural polymer, coir is used for production of various products including geotextiles, floor coverings, door mats, furniture padding, handicrafts, brushes, ropes, coir pith organic manure and as filling for mattresses. Made from 100 per cent biodegradable material, coir products can be safely disposed and returned to nature.

In the state of Kerala, the natural, biodegradable and environment friendly fibre of coir makes it the largest

cottage industry employing over a million people. Women constitute about 75-80 per cent of the work force in the coir industry and majority of them are from rural areas belonging to economically weaker sections of the society.

The coconut husk, which otherwise is treated as a waste is not only a source of livelihood for huge number of people but also have vast potential to provide a natural alternative to synthetic products. A coir product is made through processes that do less harm to the environment compared to their existing equivalents that are largely made up of plastics, wood and metals. Manufacturing processes of coir are largely focused to lessen carbon emission, reduce waste or do away with any waste, and manage excesses. Thus, with the use of coir products, consumers not only help the environment but also protect public health and promote rural livelihoods.



# Eco-Friendly & Natural Tableware from Areca Leaf

According to a study in 2015, of the 8.3 billion metric tonnes of plastics that had been produced, 6.3 billion metric tonnes had become plastic waste. Of that, only nine per cent could have been recycled and almost 79 per cent was accumulated in landfills or sloughed off in the natural environment as litter. With the increasing use of plastic in everyday life, the situation might not be different in 2018 considering the non-biodegradable plastic, which goes to landfills and remain there for centuries.

## Deepam Palm Dish, Thrissur, Kerala

In this world of plastics, Deepam Palm Dish from Thrissur district in Kerala is manufacturing disposable tableware from the biodegradable and natural areca sheath. Areca nut also called 'Betel Nut' is an important cash crop grown profusely in the tropical regions of India. The raw material used for disposable plates and cups is the Areca nut sheath, which is an extension of the dry leaf. The sheaths are taken from the leaves, which get dry and fall on the ground and from there it is taken to processing units. There is zero harm to the natural setup even in the initial stage of collecting raw materials.



The food containers are natural, biodegradable, lightweight, relatively inexpensive, microwave safe, leak-proof and can easily be moulded into the various shapes of disposable tableware.

This eco-friendly tableware is in huge demand in countries like United States, United Kingdom, Australia, Singapore, Germany and Middle East, making India the hub of sustainable alternatives.

The company registered as a small and medium enterprise is not just reviving the tradition of using natural, chemical free leaves as tableware but at the same time providing livelihood to people involved in the process, especially the women.

# Textiles from Natural Banana Fibre

Textile tradition of India is rich and diverse but the production of textiles is an extensive cycle involving consumption of gallons of water, chemicals, energy and generation of wastes at each stage. Natural fibres are getting a significant deal of attention in modern times due to their characteristics of being sustainable and healthy option and are now largely used in textile industries and handicrafts.

C. Sekar is one such artisan in Chennai in the state of Tamil Nadu who gave new dimension to the concept of natural fibres. Inspired by article related to an ancient Indian epic, Ramayana, the idea of fabrics from Banana fibre came up and got converted into this eco-friendly natural alternative to synthetic fabrics. Sekar weaves pure banana fibre fabrics and mixed varieties largely with silk or cotton. One can find beautiful sarees, yardage, even denim material and natural fabric weaved with natural fibre treated in a solution of neem, turmeric and tulsi. He has named his venture as 'Ananafit' which is translated as Banana fit in English.

Together with other weavers he organised themselves into a formal body — The Anakaputhur Jute Weavers Association — and assembled 12 women's self-help groups. In 2012, Limca Book of Records recognised the weavers of Anakaputhur for making saris with 25 varieties of natural fibres such as the banana stem, cotton, bamboo, jute, pineapple, aloe vera, hemp, sea grass, lemongrass as well as recycled silk, linen and wool fibres, besides others.



# Sharing Since Ages-Sharing Economy in India

Sharing has been part of India's culture since ages but gradually with changing times and generations, the habit of 'use and throw' increased causing landfills to swell. With depleting resources, the revival and acceptance of the ancient cultural habits based on the principles of sharing and circular economy became the need of the hour. India has lot to show to the world about how to adopt a circular and less wasteful lifestyle.



## Wedding Bells, Delhi

Wedding Bells-Rent an Attire is a store hit amongst residents of Delhi whenever there is a wedding or a celebration in the family. The place offers huge designer collection of clothes for both men and women on rent who can chose from both fresh and second hand pieces without spending a huge amount on often one-time use dresses. The store witnesses customers from all sections of the society breaking the taboo of renting clothes as against the standards of high-income groups and promotes the concept of circular economy where attires are used to their maximum value.

## Johri Bazar, Jaipur

Johri Bazar in the city of Jaipur, Rajasthan is the central point of business of renting clothes since more than five decades. People prefer to rent a dress instead of spending huge amount on it. From Sherwani (traditional wedding dress in India) of groom to all accompanying accessories and jewellery of bride, everything can be taken on rent at a reasonable price from this market in the walled city of Jaipur.



## Thuli-Shopping with Dignity

Thuli (which means a drop in Tamil) is a store located in Adyar that aims to offer the shopping mall experience for those who come from the lesser privileged sections of the society. A non-profit organisation in February 2018 has proudly served more than 2,500 delighted customers in a span of just two months. Though charity is the sole intention behind the start-up, the activity which it does do largely contributes to sustainability and circular economy principles. With the support of around 10 volunteers, Thuli collects used garments, toys and footwear from people across the country and display them at their store. Underprivileged children who are identified with the help of local NGOs approach the store with their families to experience the joy of shopping. To make the kids feel empowered, Thuli through the NGOs distribute free vouchers with the maximum price limit quoted for shopping, giving an opportunity to choose according to their taste and fittings.



## Friday Market, Chennai

Reuse and recycle are openly practised since ages in the 200 plus year old Friday Market commonly referred to as “Sandhai” (in Tamil) at Pallavaram on the outskirts of Chennai, Tamil Nadu. More than 1,000 stalls are put up overnight and sell a variety of goods (new and used) regularly since as early as 1800s. There are a variety of items for sale like clothes, old coins, plastic goods, cattle, pets, computer parts, pen-drives, mobile phones, motorcycles, old CDs and DVDs, food stuffs, agricultural tools, cycles, table fans, air-coolers, air-conditioners, televisions, lamps, laptops, furniture, antiques and many more. Almost hundreds of kilograms of e-waste, plastics, textiles, metals and other wastes are reused and recycled here, which would otherwise have ended up filling the dump yards. The market thus chips in greatly for reducing the carbon footprint since ages.

# Energy Efficient Structures: Indira Paryavaran Bhawan

The office space of Ministry of Environment, Forest and Climate Change, Government of India popularly named after the first woman Prime Minister of India Indira Gandhi is one of the most sustainable designs in contemporary period.

The bricks used in walls, the concrete, mortars and plasters of entire building have fly-ash in them, which otherwise is considered as a waste of thermal power plants. Three times lighter Autoclaved Aerated Concrete Blocks with heat insulation properties maintains the interior temperatures. The materials used for flooring, claddings are locally available stone and one can prominently see broken marble and Kota stone at the beautiful walking space of the building. Not just the building material but the interior door frames and shutters are made using rapidly renewable bamboo-jute composite.

The structure is facilitated with Grid Interactive Solar Power Generation System with capacity of 930 Kilowatt peak generation. The solar power generation is around 14 lakh units (kilowatt hour) of energy, which is also the annual energy requirement of the space making it Net Zero Energy Building of India.

The beautiful combination of traditional passive air cooling features inspired and extracted from Indian palaces and forts and the chilled beam

system of air conditioning using geo-thermal energy for heat exchange has been very carefully and innovatively used in the building. The structure has pipes running into the ground, which would cool the condenser water from 38 degrees Celsius to 31 degrees Celsius. This is akin to cooling of ancient architectural structures, which ran water pipes into the building to cool the structure and also to create pools and water bodies for evaporative cooling. This system of vertical pipes runs 80 metres deep into the ground and creates free cooling of the water in a closed loop condition. This also helps in water conservation in cooling towers for HVAC (heating, ventilating, and air conditioning) system.

The building makes a unique combination of traditions and technology to save energy, reduce pollution levels and promote circular economy to its full potential.



# Zero Waste Generation: Alappuzha, Kerala

Ever looked around your surrounding and wondered what pleasure it would have been to live in a city with zero waste generation and no filth around. Alappuzha is one of the 14 districts in the state of Kerala in India with total solid waste generation of 58-60 tonnes per day, of which 75 to 76 per cent is compostable organic waste. But none of it comes out of the houses to the road and everything is managed within the boundaries of the households.

## **Nirmala Bhavanam Nirmala Nagaram Project**

The urban local body in coordination with district Suchitwa Mission (Cleanliness Mission) started implementing a project called 'Nirmala Bhavanam Nirmala Nagaram' (Clean Homes, Clean City) in November 2012. The project focussed on segregation and treatment of wet waste at the source itself and worked with a plan. The households with a backyard were encouraged to set up portable or fixed biogas plants and those without enough space were given option of piped composting. The municipality offered huge subsidies to promote the acceptance and to ensure effective implementation of these mini personal plants; it also formed a team of two-three trained women in every ward for maintenance.

The strategy was to deal with compostable waste within the household boundary and for non-compostable waste like plastics, glass, e-waste etc. periodic collection was fixed on specific date and locations.

Till date, the municipality has set up 23 waste collection centres with around 220 bins at public places and the old waste dumping sites. These are maintained by the 170 plus contingent workers of the municipality who used to earlier collect waste from dump spots in the city. The households, which do not have other waste processing facilities can bring their waste to the aerobic bins, which are set up within a radius of every one kilometre. About 10,000 households are connected to these collection centres and 25 per cent of the bio waste from small shops also reached these bins. Compost generated from these bins is given free of cost to farmers.

Interestingly the 'Clean Homes, Clean City' initiative has helped Alappuzha municipality earn few awards including the Kerala government's energy conservation awards for 2013-14, Clean City Award from the Centre for Science and Environment in 2016, and the recent recognition by UNEP as one of the five top clean cities in the world.



# No Electricity Use, No GHG Emissions-Clay Refrigerators

Think about days when there were no refrigerators to preserve vegetables, fruits, milk or cool water. Those were the days when our ancestors lived a healthy life because they relied on natural alternatives of earthen vessels, utensils and pots for all these tasks without compromising their health and harming the environment with harmful gases these refrigerators emit.

## Mitticool- Eco-Friendly Clay Products

Mansukhbhai Prajapati from Gujarat through his innovative design of Mitticool Clay Refrigerators has shown to the world how traditions can work wonders. Through his entrepreneurial skills and innovative mind, he has converted the concept of earthen pots into clay refrigerators, which are capable of preserving food items for a week without the use of electricity and emission of harmful gases.

The principle of evaporative cooling is used in the design where the refrigerator body made up of porous clay allows movement of water initially filled in the water tank at the top level of model. The capillary action takes water to the outside of the pot, which evaporates in turn cooling the pot as it loses heat to the leaving molecules' kinetic energy. This process then cools down interior of the refrigerator by conduction, thus giving natural protection to the stored objects.

The natural machine does not require electricity or any artificial energy and therefore, has no recurring costs. The refrigerator preserves the original taste of fruits and vegetables, which otherwise is lost in artificial conditions maintained by electricity-operated machines. At present, the model is available in 50 litres capacity but soon the 120 litres model will be available in the market.

Apart from clay refrigerators, there are products like clay water filters, non-stick pans, pressure cookers, tableware, water bottles and many more, which takes us back in time and taste of nature.



# Chill Water with Natural Air and Sunlight

## Notion Technocrats India- Natural Water Coolers

Rightly said, "Necessity is the mother of Invention" but for Arvindbhai Patel from Ahmedabad, his sickness became the mother of invention when the idea of natural water coolers first came to his mind while he was down with fever. The way cold packs work to bring down the temperature became the working principle of his model of Natural Water Coolers.

Inside these water coolers, water is passed through copper coils covered with cotton cloth, which is continuously being moistened by a dripper. Evaporation of water from the cloth wrapped on the coil cools the water inside to 21-22 degree Celsius at atmospheric temperature of 40-42 degree and 50 per cent relative humidity. Also, the use of cooper pipes reminds us of Ayurveda which prescribes cooper enriched water for healthy stomach.

The model is appropriate for supplying cool drinking water in hot summer, particularly in areas where electricity is absent or erratic. The model is available in the capacity of 150 litres with huge demand all over the country.

The sustainable design comes with minimum maintenance and maximum use providing cool drinking water at public places like schools, parks, offices, banks, hospitals, and bus and railway stations.



# Socially Responsible Construction: Development Alternatives

Amidst the rising concern of smog in the capital of India, lies the building of Development Alternatives standing tall and strong with its head held high in the world where construction sector is shamefully leading the pollution index both directly and indirectly.

Right from the stage of production of raw materials to construction and completion of building and further to maintenance, the headquarters of Development Alternatives (DA) in New Delhi has taken care of every step to deal with Grey energy in the sector, which is often ignored as a one-time affair. It is often called as the “Greenest Building in Delhi”.

The old building of DA that was constructed using non-stabilised compressed earth block (CEB) was not just demolished but the materials from it were reused in the new building at the same place giving it the tag “New Building with the Soul of Old”. The new structure strengthens the faith in concept of sustainable habitats using compressed earth blocks and fly-ash blocks. Efficiently built in reinforced concrete and masonry, the building uses less than half the reinforcing steel used in comparable structures of modern designs and use of highly energy



intensive materials like aluminium is shunned in the construction of the building. Eighty percent of the building material was sourced within 500km of the site, which has helped to restrict the carbon dioxide emissions from transportation from huge distances. Not only the use of simple local materials but also the use of local labour having traditional skills and fine craftsmanship was given due importance during each step of design, construction, use and recycling of building material. The well thought out orientation of building maximises proper day light and ventilation in the interiors, thereby reducing the electricity cost. Even the system of air cooling in the building is inspired by the traditional techniques of passive cooling. The hybrid air-handling units integrate evaporative cooling and refrigerant-based cooling to reduce energy consumption by 30 per cent and additionally reduce water consumption.

The building is an absolute delight to eyes and comfort to body in the deadly heat of Delhi. The thought and designs behind the making of this sustainable marvel shows us the way forward to reduce the pollution at all levels of construction and maintenance of a building.



# Sustainable Environment Friendly Hybrid Chillers

Temperatures are certain to go up further than current levels and the penetration of air conditioners (ACs) in individual households is expected to increase simultaneously. According to a report, the world is poised to install 700 million ACs by 2030, and 1.6 billion of them by 2050. In India, especially in the hot and dry areas the air coolers act as pocket friendly and sustainable alternative to air conditioners. In Rajasthan, the districts of Jodhpur and Banswara are acknowledged for their traditional skills of manufacturing metal and wooden coolers, which are not just cost effective but saves on huge electricity consumption without emitting harmful Green House Gases (GHG).

## Vaayu India- Hybrid Cooling Machines

While the conventional air coolers have their limitations in humid areas, entrepreneur couple Priyanka and Pranav from Indore, Madhya Pradesh have introduced to the world an alternative to save the earth from harmful effects of ACs without compromising the comfort. Vaayu Hybrid Chillers is the first cooling machine, which comes with unique technology of blending traditional air coolers with ACs, taking the best from both. Comparing a 6 ton

AC and the Vaayu MIG 24 of the same work capacity, the Vaayu machine saves 87 per cent of the electricity cost.

As soon as the power is switched on, the compressor in the Vaayu machine starts and the refrigerant flows in the cooling coil to chill the water. Chilled water gets circulated on the pads of the machine by pumps and when outside hot air comes in the contact with the chilled water, the molecules present in the hot air loose the temperature and become chilled. Thermostat helps to put pressure on and off as per the requirement of the water temperature to be maintained and prevents the compressor from overheating. At the same time, condenser cools down the refrigerant and helps in dehumidification of excess relative humidity to control the humidity level. The chilled air is pushed inside the area where the units are installed through a fan, thereby, giving the comfort of low and relaxing interiors.

The machine emits no harmful gases, saves huge on electricity use when compared to ACs and provides maximum comfort. There are multiple variants available depending upon the size of space, which are more affordable and cost-effective than same capacity AC.



# Save Trees-Use Invasive Lantana' Furniture

According to International Union for Conservation of Nature (IUCN), Lantana Camara is one of the world's 100 most invasive species, and among the world's 10 worst weeds. It has particularly become abundant in India's dry-moist forests.

Padma Shri Anil Joshi of Himalayan Environmental Studies and Conservation Organization (HESCO), Dehradun used his knowledge of environmental sciences and traditions to deal with Lantana. It was his idea that a weed became a valuable local resource for the people in hilly region of Uttarakhand. HESCO provides training to villagers and interested volunteers for manufacturing lantana furniture from its stem which is hard enough to replace timber for the same use.



The Ashoka Trust for Research in Ecology and the Environment (ATREE), Bengaluru replicates this initiative in southern part of the country, training locals to use this technology to make baskets, furniture and other utilities that they can sell.

Lantana products being low-cost, durable, resistant to termite and bedbugs, coupled with the advantages of easy maintenance (a coat of varnish paint once a year) and aesthetic appeal have increased their demand among the consumers. Today lantana craft programme is an alternative for other varieties including bamboo and cane. With dwindling bamboo resources and restrictions in bamboo harvest, shifting focus on an easily available weed lantana has appeared as a viable and profitable alternative. Apart from making furniture and other utilities, the weed is also used as an alternative raw material for making world famous Chennapatana toys.

Innovations and community efforts like these will certainly bring about a balance in ecosystem while simultaneously advancing the livelihood of people for the betterment at the grassroots.

# Upcycling Waste-RImagined, Bengaluru

According to recent estimates, by 2030 India will need a landfill almost as big as the city of Bengaluru to dump its waste if it continues to generate waste at the current rate. While the first step towards maintaining the environment is to generate lesser waste, the next best thing is to make sure that we make the most of the waste generated in a sustainable and eco-friendly manner.

RImagined, Bengaluru is a venture making a conscious attempt to not just promote responsible consumption of limited resources offered by mother earth but to extract maximum value of products before they end up as waste. The founding principles are also straight and clear: Up cycling of waste and at the same time providing sustainable livelihoods with specific focus on women from urban and rural areas. RImagined till now has managed to pull away nearly 15-20 tonne of waste from landfills. This



includes all types of low value waste, such as waste that does not decompose or does not get effectively recycled.

Other than up cycling, the organisation also empowers women from marginalised families by providing them with employment opportunities and skill development. Self-help groups from diverse part of the country are now trained to convert tailor waste and other discarded items such as torn and used clothes, cardboard boxes, wood waste and used tyres into beautiful and useful products.

The diversion from conventional linear economy is urgent need of the hour and ventures like RImagine are showing how waste can be converted into wealth in a creative and sustainable manner.

# Rethink Timber, Go for Bamboo

India is blessed with 20 per cent of the world's bamboo resources with more than 50 per cent of concentration in north-eastern part of India. Not just the natural resources with maturing age of three to four years, bamboo is the major source of livelihood for people in the north-eastern part of India who are traditionally involved in bamboo craft since generations. The Nalsar village in Sepahijala district in Tripura is the base of bamboo baskets supplied all over India. Every member of each household in the village from the youngest to the oldest is trained with the traditional skills they inherit from generation to generation.

Bamboo is one of the most important nature's substitutes for the endangered rainforest hardwoods. It is a quick-growing, versatile, non-timber forest product whose rate of biomass generation is unsurpassed by any other plants.

Initiatives by people like Kamlesh Salam, popularly known as 'Bamboo Man of India' and founder of 'World Bamboo Day', cannot go unacknowledged. It was he who identified and promoted the potential of bamboo as an alternative to hardwood through research and design. Rapidly increasing interest in bamboo products and materials along with skyrocketing demand especially for sustainable alternatives has encouraged setting-up of Bamboo and Cane Development Institute, Agartala by Government of India and ventures like ESES Bio Wealth Pvt Ltd, Guwahati.

The depleting natural forests are a sign to opt for alternatives immediately to save our eco-system. Bamboo has a huge potential to replace timber and its time that this natural resource gets the attention it deserves.



# Glossary

1. Adobe Bricks: Adobe bricks (mud bricks) are made of earth with fairly high clay content and straw. If produced manually the earth mix is cast in open moulds onto the ground and then left to dry out. Adobe bricks are only sun-dried, not kiln-fired.
2. Anakaputhur: It is a suburb of Chennai in the Indian state of Tamil Nadu.
3. Anandi: Means “One who is always Happy”.
4. Ayurveda: System of traditional medicine.
5. Bodhi: In Buddhism traditionally it is translated as enlightenment, although its literal meaning is closer to “awakening”. The verbal root budh- means “to awaken.”
6. Buddhism: Religion and philosophy that developed from the teachings of the Buddha (Sanskrit: “Awakened One”), a teacher who lived in northern India between the mid-6th and mid-4th centuries BCE.
7. Chennapatana: A small city in Karnataka state of India popularly known as the “toy town”. It has a legacy of toys which goes back to more than 200 years.
8. Cob Technique: Cob house construction is an ancient building technique using lumps of earth mixed with sand, straw, and water.
9. Deepam: Means “Light of Hope”.
10. Grey energy: Cob house construction is an ancient building technique using lumps of earth mixed with sand, straw, and water.
11. Indira Paryavaran Bhawan (IPB): Named after former prime minister of India, Indira Gandhi. *Paryavaran* means Environment and *Bhawan* means large house.
12. Johri Bazar: Bazar means ‘market’. Johri Bazar is a marketplace in walled city of Jaipur, Rajasthan.
13. National Family Health Survey (NFHS) IV: The National Family Health Survey (NFHS) is a large-scale, multi-round survey conducted in a representative sample of households throughout India.
14. Neem, Turmeric & Tulsi: Neem=Azadirachta indica; Turmeric (*Curcuma longa*) is a rhizomatous herbaceous perennial flowering plant of the ginger family; *Ocimum tenuiflorum* (synonym *Ocimum sanctum*), commonly known as holy basil, tulasi (sometimes spelled thulasi) or tulsi, is an aromatic perennial plant. All are native to Indian Subcontinent and have medicinal value.
15. Nirmala Bhavanam Nirmala Nagaram: Decentralised solid Waste management Project of Alappuzha municipality in Kerala.
16. Padma Shri: Fourth highest civilian award in the Republic of India.
17. Ramayana: Ancient Indian epic.
18. Sandhai: Term used in Tamil (language in India) for ‘Market’.
19. Saree: A garment consisting of a length of fabric elaborately draped around the body, traditionally worn by women in India.
20. Sherwani: a knee-length coat buttoning to the neck, worn by men from South Asia.
21. Siddhartha: Buddha was known as ‘Siddhartha Gautama’ before enlightenment.
22. Suchitwa Mission: Total Sanitation Campaign in the state of Kerala.
23. Vaayu: Means “Air”.

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