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## Challenges of a Sustainable Microenterprise – Case Study of EcoCollab

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### ABSTRACT

This case deals with the most critical and urgent requirement of the business world, that is sustainability. While profit motive and shareholder capitalism has been the norm for the past century, new management thinking requires a deep understand of sustainability to remain viable in future. Sustainable infrastructure is a rarely understood concept, by all stakeholders – from professionals to consumers to governments to academicians. Through the example of EcoCollab, the reader is introduced to the overall concept of sustainability and specifically of sustainable infrastructure. The Management issues that are covered are the following: Understanding customer expectations and need. EcoCollab's offering first required concept selling as there were negligible demand for their service. It was important to also accept the customer need of low cost and provide a solution that met with this need. EcoCollab founders display grit, determination and an ability to follow their dream through. They showed sound understanding of the market and succeeded in building a core and advisory team, that addressed the customers' needs. This case can be used by Management Students specialising in Human Resources. Students of Strategy and Marketing may also benefit from this case.

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### 1. Introduction

The Intergovernmental Panel on Climate Change (IPCC) presented its sixth Annual Assessment report in 2021, providing irrefutable evidence that the planet's increasing rate of warming is due to Anthropocene or human-led activities (IPCC Report, 2021). Infrastructure contributes to 79% of all Green House Gas (GHG) emissions and 88% of climate change adaptation is spent in this sector (Thacker S et al, 2021) [1-5]. At the same time, Infrastructure impacts the achievement of 92% of all Sustainable Development Goals, making it one of the leading enablers of human development, health and dignity (Thacker S et al, 2021). According to the United Nations Human Development Report, 2021, 2.5 Billion people will be living in urban areas by 2050 and consequently urban infrastructure development needs is expected to increase manifold. Urban sprawl and the resultant construction activities are a leading cause of Land Degradation, which further affect our food and water systems (UNCCD Report, 2021). 30-50% of India's soil is also degraded and land altered considerably, according to the United Nations Convention to Combat Desertification (Verberg P H, 2019) [6-10]. The latest IPCC report states that infrastructure in economically weaker countries like India, are highly susceptible to damage and loss due to climate change, especially in the low-lying areas such as coastal cities. 3 of the 4 large metropolitan cities of India, namely Kolkata, Mumbai and Chennai are susceptible to cyclones and extreme weather events due to proximity to the sea. Nature-based solutions and adaptation techniques that retrofit existing infrastructure with 3 of the 4 large metropolitan cities of India, namely Kolkata, Mumbai and Chennai are susceptible to cyclones and extreme weather events due to proximity to the sea. more resilient and climate-friendly

systems, is a dire necessity. However, the report states a gap between Climate Adaptation and Mitigation plans being drawn up for infrastructure and implementation. In a country like India, where low-cost housing and production units form a large part of the infrastructure requirement, incorporating sustainable techniques to reduce impact on planet and its warming, become a challenge. Development of infrastructure is key to economic development of a country. Therefore, developing countries face the dilemma of choosing between rapid infrastructure development and planetary health, as most often, one comes at the cost of the other. The 21st Conference of Parties (COP) held in Paris in 2015, brought together 196 world leaders, who signed on an Agreement to limit the heating of the earth to 2 degrees Celsius and preferably 1.5 Celsius over pre-industrial levels. For developing countries, achievement of Sustainable Development Goals such as Zero Poverty seems unachievable without rapid industrialization and infrastructure development [11-15]. The challenge of providing basic provisions like food, education and healthcare in poor countries, over rides all other concerns, including that of planetary health. However, the Paris Agreement and more recently the IPCC report, show that human development at the cost of planetary health, harm human health in the long run. Therefore, sustainable development that minimizes adverse impact on the planet while providing humans opportunities and possibilities to develop, leading to a more resilient and healthy future for both planet and consequently all life on it, is the only possible way forward.

### 2. Present Scenario

The 2022-23 Indian Budget provides for increased investment on Infrastructure, including expanding of

National Highways by 25,000 kms and development of megacities and ‘hinterlands’ to become centres of economic activity (India Budget Speech, 2022). Such unprecedented construction activities can impact life and livelihood adversely if not done sustainably. 75% of India is vulnerable to extreme weather events and are climate hotspots, due to its geographic location. Unsustainable construction activities may lead to further environmental damage, eventually reducing the quality of human life that it had initially set out to improve (Agrawal OP et al, 2022). Agrawal predicts 34 million jobs will be lost due to heat, in India, a significant portion of which will be labourers working in construction. The rapid loss of vegetation, concretization of roads and use of unsustainable building material adds to the warming problem while reducing quality of air, soil and water.

Figure 1 below shows the share of GHG emission of each sector. Energy contributes to GHG emissions the most and within that, a significant portion is attributed to energy requirements of buildings. Material use, transportation and other inputs into Buildings are part of the segments of the pie-chart.

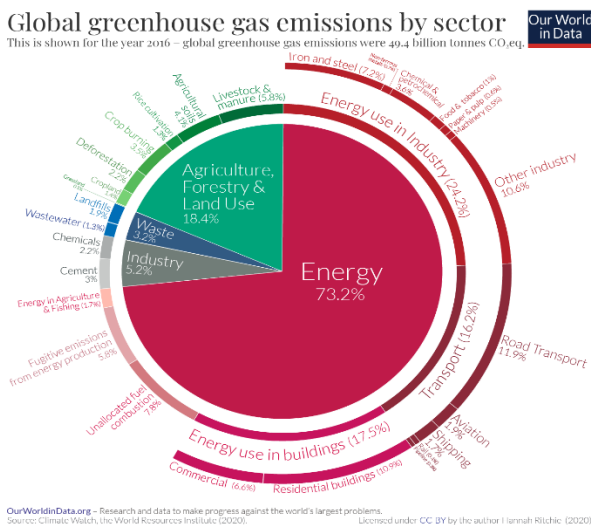


Fig. 1 Sector-wise GHG emission.

Experts advise the following steps to meet with the infrastructure demands while keeping heating and pollution in control:

- (1) Energy efficient designs that reduce the need for artificial cooling or heating and lighting of spaces. Diana Urge Vorsatz, Professor of Climate Change and leading author of the IPCC report says, planting trees, ensuring proper ventilation of old buildings and ensuring new buildings are not glass and steel cages that can't withstand a heatwave, will be wiser and more sustainable solutions (Urge-Vorsatz, 2015).
- (2) Blue-green infrastructure where plans include adequate green spaces and water bodies, including green roofs and water management systems within buildings.
- (3) Sustainable mobility where city plans include public transport pathways, cyclists and walking paths, which disincentivise use of personal car.

- (4) Sustainable building material which reduces the use of cement, concrete and glass, which have the dual damaging impact of having high carbon footprint as a raw material and lead to heating of buildings that require artificial cooling, further raising temperatures.

2.1. The Challenge

The above requirements need an extensive panel of experts to deliver on such a wide range of solutions. Start-ups typically have budgetary constraints which make it difficult for them to hire a large team, especially that of experts who demand a high salary. However, the business need demands a complete range of technical solutions, if the customer demands have to be met of a one-stop platform for reasonably priced solutions.

Additionally, sustainable architecture is a new concept that faces stiff resistance from people. The success of the organisation depends on its ability to change customer mindset towards it.

2.2. Creation of EcoCollab

To address the urgent need for sustainable infrastructure, Arundhati Sett and Anamika Garg, India-based architects, co-founded EcoCollab in 2021 as a one stop platform for eco-friendly buildings and related solutions. A common point of frustration for both founders was that natural material that could potentially be used as building materials, such as crop stubble, was being burnt, adding to the air quality crisis of India. At the same time, the opportunity of using eco-friendly building material rather than carbon-intensive Reinforced Cement Concrete and kiln-fired bricks was being missed. Additionally, the founders sought to find a solution which made holistic sustainable buildings accessible to customers and stop inefficiencies such as partially performing Green buildings.

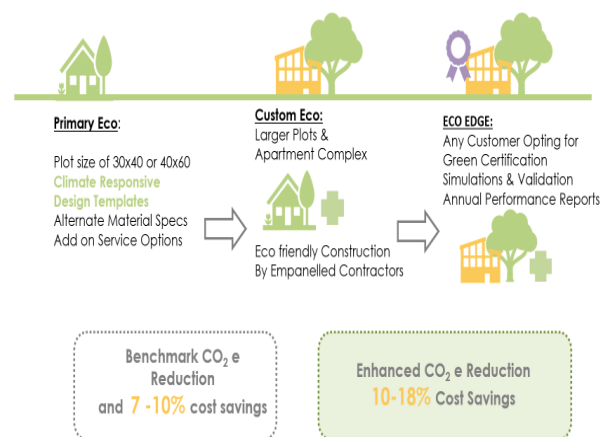


Fig. 2 How EcoCollab Works.

While heading the ‘Affordable Housing Program’ of Ashoka under the Pradhan Mantri Awas Yojana programme of the Government of India (<https://pmaymis.gov.in/>), Arundhati was able to see the impact large scale sustainable buildings can make. Similarly, Anamika has experience with large projects and understood how policy can positively

change the Indian built environment. This awareness led them both to start EcoCollab.

The founders surveyed customers to understand their approach towards sustainable buildings and found that 90.2% respondents felt they would like to live or rent an eco-friendly home or apartment but they perceived them to be expensive. This is a misconception as natural material may cost less and provide long term cost advantage in terms of energy savings. As the construction industry continues to grow, the need to get customers to opt for sustainable methods that are convenient and cheap, became urgent. Sustainable methods of building have a low uptake in India also because of lack of access to sustainable methods. Conventional methods were easily available, even though they bear a high cost for the customer as well as the planet. Therefore, the challenges which led to the creation of EcoCollab can be summarised as:

- (1) Making natural building materials available and cost effective for customers
- (2) Make sustainable building options more accessible to customers.
- (3) EcoCollab addressed both the issues through their online platform, [www.ecocollab.com](http://www.ecocollab.com), where experts advice on sustainable methods of building and provide required support for implementation.
- (4) EcoCollab collaborated with organisations such as GreenJams and EarthBlocks to use eco-friendly bricks rather than the conventional ones, to demonstrate that sustainable buildings can be cost effective.

**Key areas that EcoCollab has addressed since its inception in 2021 are**

- (1) Design for India’s hot climate: the firm has used natural ventilation, mutual shading of masonry walls, correct window-wall ratio and latticed facades to keep buildings naturally cool and lit. The team has used innovative techniques like Matka ceilings, Multi-layer Perceptrons (MLP) and Agri Bio-panels instead of plywood to keep temperatures low, of both the buildings and the planet.
- (2) Use of recycled and natural material: EcoCollab used Compressed Stabilised Earth Blocks (CSEB) made from excavated earth which not only reduced the use of carbon-intensive material but also prevented the material from getting illegally dumped. Natural material like Agro-crete made from husk and eco-friendly bricks are being used to replace earth-warming and carbon-intensive material like concrete and traditional bricks.

**3. Team Structure**

Sustainable buildings require expertise across a wide variety of areas, ranging from Renewable Energy, Water management, Natural building material to Sustainable designs that minimise use of resources and energy. While all of them are interconnected, an organisation that aims to be the single source for customers of new and existing construction, needs deep expertise in each specific area. Therefore, the EcoCollab team comprises a Core Team, led by experts in different aspects of sustainable buildings and a team of collaborators, who provide creative and technical expertise when required. This addressed the challenge of

hiring a large and expensive team of full-time experts, who would further increase the price of the services offered.

**3.1. Founders**

Arundhati Sett is a LEED certified Architect, Urban Designer and Sustainability professional who worked on Schools and Community colleges in California, using the LEED framework or Collaborative for High Performance Schools, before relocating to India. She has completed around 4,00,000 square feet of commercial, residential and industrial projects in the country and before co-founding EcoCollab, she managed the Housing for All (HFA) program of Ashoka, funded by The Hilti Foundation. She studied Urban Design in Penn State University USA. Arundhati heads the design division, sustainability planning and Life Cycle analysis of projects, for EcoCollab.

Anamika Garg is an Urban Planner, Architect and graphic designer and she aspires to be an academician. Her experience cuts across architecture, interiors and urban planning. Vision is to simplify sustainability and make it accessible to all. Her work ethic is customer-centric and involves deep understanding of the customer mindset. Anamika heads the Green Building certification and Sustainability Master planning in EcoCollab. She studied Urban Planning in CEPT Ahmedabad.

**The core team comprises people with the following specialisation areas**

- (1) Green Building certification
- (2) Water conservation and monitoring
- (3) Carbon negative bricks
- (4) Water purification and sanitation
- (5) Urban organic farming
- (6) Carbon negative agri-bio panels
- (7) Waste management

**4. Achievement of Goals**

One of the key goals of EcoCollab was to create a business case for CO2 reduction. The existing perception is that adopting alternate materials that reduce carbon footprint, are expensive. EcoCollab’s research proved that during the construction stage itself, 4500 kgs of CO2 emission could be prevented in 1000 square feet of built area. The EcoCollab toolkit was used by a customer to reduce 9000 metric tonnes of CO2 emission with lower construction cost, refuting the notion of CO2 reduction being expensive.

EcoCollab, in collaboration with WRI (World Resources Institute), Mahindra Lifespace Developers Limited and Alliance for an Energy Efficient Economy, conducted stakeholder consultations that led to the creation of a Charter for Net Zero and Building and Construction sector.

The firm has been recognised for its work in making sustainable building options mainstream, through multiple awards such as the winner of the Women Founded Start-ups Accelerator Program, awarded by NITI Aayog, the public policy think tank of the Government of India and FICCI (Federation of Indian Chambers of Commerce and Industry).

**4.1. Addressing the Indian consumer mindset**

India’s infrastructure is growing at an unprecedented rate, but only 5% of its buildings are ‘Green Certified’ according to the Indian Green Building Council (IGBC). The council,

which is part of the Confederation of Indian Industries (CII) states that 70% of the buildings are yet to be created. The new buildings need to be sustainable, if India has to reduce its contribution to Climate Change and air pollution. This thinking could provide a boost to the Green Building practice in India, provided the customers are willing to appreciate the need for it and accept that sustainable buildings provide them long term benefits.

As part of this paper, the Author interviewed 5 large builders in South Delhi, constructing housing units of a minimum of Rs 3 Crores per unit. The interviews were conducted to understand the uptake of Sustainable Buildings in South Delhi region.

**The summary of the interviews is presented below**

- (1) All builders claimed to know about Green Buildings. Only 2 of them were able to name any one green building certification. Only one had heard of the GRIHA (Green Rating for Integrated Habitat Assessment) certification because the first GRIHA house in India is in Chittaranjan Park, a locality where the builder also worked.
- (2) None of the builders were using any sustainable processes while constructing, other than minimising the cutting of trees and keeping a few feet of open ground around trees, as that is a Municipality guideline. Most of the builders admitted that they have cut trees which came within the perimeters of the house, as the customers wanted more space.
- (3) Customers did not ask for Rain Water Harvesting, Solar Panels, Low VOC paints, natural materials as they were not aware of the benefits or the health hazards of harmful chemicals inside their houses. As a consequence, the builders have not invested in any of these techniques.
- (4) EcoCollab set out to burst the ‘Sustainable is Expensive’ myth and successfully enabled resource use and carbon emissions while keeping costs low.

**They addressed all segments of the Value Chain, as explained below**

- Design

EcoCollab’s efficient designs can help save 5000 kgs of CO2 emissions per 1000 square feet of built-up space, by ensuring that the units are built using natural material, facades are placed in a way that heat is not trapped and green spaces are provided for cooling and CO2 absorption. Depending on the location of the unit, the team designs so that particular challenges can be addressed, such as water scarcity.

- Material Use

One of EcoCollab’s goal was also to use agricultural waste, which otherwise got burnt, increasing air pollution and warming, while missing the opportunity of using a sustainable material which leaves no toxic footprint. Agrocrite is made of agricultural waste and upcycled material, which is lighter and reduces construction time, making it a cost-effective option as well. Compressed Stabilised Earth Blocks (CSEB), also called Mud Blocks do not require ovens, often coal-fired, like traditional bricks, thereby reducing use of fossil fuel. Additionally, they are

made using excavated soil, saving forests which are damaged to extract soil for traditional bricks. Mud Blocks are weather resistant and ancient monuments built out of them, have withstood the ravages of time, saving costs in repair.

- Energy Use

EcoCollab partners with organisations to ensure the lighting and ventilation designs minimise use of energy and compliant with energy standards such as ECBC (Energy Conservation Building Code).

- Water Use

EcoCollab projects embed Rain Water Harvesting, natural Water filtration systems that do not need electricity and AI based Water usage monitoring systems to minimise waste.

- Waste Management

In partnership with composting expert organisations, EcoCollab ensures household waste is re-used as compost, reducing burden on landfills and preventing methane emission which has a higher warming effect than CO2.

**5. Conclusions**

The biggest challenge facing humanity today is the triple headed problem of Climate Change, Biodiversity Loss and Pollution. The UN Secretary General, Antonio Guterres stated that the present state of the planet is “Code Red for Humanity” and threatens our entire civilisation, unless drastic steps are taken to mitigate the effects of global warming. The Infrastructure sector contributes significantly to all three aspects of the problem. Building materials like cement are carbon intensive and the present trend of creating glass-chrome cages that trap heat, are exacerbating climate change. Volatile compounds being used for interiors add to the air, soil and water pollution while cement dust continues to be a major component of air pollution in cities like Delhi. Unsustainably build structures destroy biodiversity through the materials they use, debris of which are often dumped in areas which become dead zones, due to leaching of toxins into the soil. Unregulated construction that does not take the existing tree cover or water bodies into account, directly affect the biodiversity of the area by disturbing the complete ecosystem.

EcoCollab chose to take on each of these aspects and designed solutions to address them. The critical success factor was cost, as customers are unwilling to pay a higher cost upfront even if it leads to long-term health benefits. EcoCollab was able to burst the myth of sustainable buildings are expensive, through their innovative designs and use of materials. They addressed all aspects of buildings and through their core team and network of experts, were able to provide solutions for new constructions of all sizes as well as mitigate risks of existing structures through their innovation water, waste and energy management solutions.

Arundhati and Anamika chose to take their frustration at the state of Indian Built Environment and convert it into effective solutions that met both the planet’s and the customer’s needs. EcoCollab demonstrates that a small entrepreneurial firm can create great impact if the team is committed, innovative and willing to work with, rather than against present consumer mindset.

Q1. What is the business case for EcoCollab

- Q2. What are the Human Resource challenges in implementing sustainable infrastructure projects
- Q3. What led to the start of EcoCollab
- Q4. How does EcoCollab achieve its goals
- Q5. What can we learn about leadership competencies required to start a sustainable business from the example of EcoCollab

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