BVEST - 12
CASE-E-KHAAS
PROBLEM STATEMENT

Case study 1:

Stubble Burning in North India.

Farmers lack affordable alternatives for crop residue disposal. Machines like Happy Seeder are costly, and subsidy schemes haven't reached all small farmers. The annual smog affects millions and increases healthcare costs.

Problem Statement:

Despite government schemes, stubble burning continues to choke Delhi-NCR and Punjab during winter.

Case Study 2:

Sustainable Wi-Fi and Digital Connectivity in India.

India is rapidly expanding digital access through initiatives like BharatNet and public Wi-Fi in urban and rural areas. However, energy-intensive network infrastructure and high device power consumption can increase environmental impact. Sustainable connectivity requires energy-efficient Wi-Fi systems and infrastructure that provide affordable access while reducing carbon footprint.

Problem Statement:

How can India implement sustainable, energy-efficient, and affordable Wi-Fi networks that expand digital inclusion while minimizing environmental impact and operational costs?

Case Study 3 :

Food Waste in Indian Supply Chains.

India wastes nearly 40% of its food production due to poor storage, transport inefficiencies, and supply chain gaps. While farmers face losses, millions of people in India remain food insecure. Current cold storage facilities are expensive and inaccessible to small farmers.

Problem Statement:

Develop an affordable and practical system to minimize food waste from farm to market. Your solution could include low-cost cold storage, better logistics, or community-driven redistribution models that also ensure food reaches those in need.

Case Study 4

Clean Energy Access in Rural India

Although India has made strides in renewable energy, millions of rural households still lack reliable and affordable electricity. Grid connectivity is inconsistent, and diesel generators are costly and polluting. Existing solar initiatives often fail due to poor maintenance and lack of local ownership.

Problem Statement:

Design a community-based renewable energy solution that ensures reliable electricity for rural households. Your plan should emphasize affordability, easy maintenance, and local participation to ensure long-term sustainability.

Case Study 5:

Reducing Single-Use Plastic in Indian Markets

Despite bans, single-use plastics remain widespread in Indian cities due to their low cost and convenience. Small vendors and street-side businesses continue to rely on plastic bags, as affordable eco-friendly alternatives are limited.

Problem Statement:

Suggest a sustainable solution that reduces single-use plastic dependency in India. Your proposal should ensure that small vendors and local businesses are not financially burdened while promoting large-scale behavioral change among consumers.

Case study 6:

Hazardous Waste from Pharmaceuticals in Himachal Pradesh & Telangana

Solan (Himachal Pradesh) and Hyderabad's industrial zones release untreated effluents. Local farmers report crop contamination, and water treatment systems are under capacity

Problem Statement:

Pharmaceutical manufacturing units discharge chemicals into rivers, harming aquatic life and soil quality.

Case Study 7:

Sustainable Housing & Urban Growth

By 2030, 600 million Indians will live in cities, creating a massive demand for housing. Current construction practices contribute nearly 40% of India's carbon emissions, rely on energy-intensive designs, and worsen urban heat islands. At the same time, India faces a shortage of over 18 million affordable housing units, forcing millions into poor living conditions.

While green buildings exist, they are mostly limited to luxury projects. The real challenge is creating sustainable housing that is affordable, scalable, and suited to India's diverse cities and towns.

Problem Statement

Propose a green, affordable housing model for urban India that:

•Uses sustainable materials and energy-efficient design,

•Integrates renewable energy and reduces lifetime carbon footprint,

•Mitigates urban heat islands, and

•Is scalable across both metros and smaller towns.

Case Study 8:

Sustainable Tourism in Himachal Pradesh

Himachal Pradesh attracts millions of tourists each year, but over-tourism has caused problems like waste generation, traffic congestion, deforestation, and water shortages. Popular towns like Manali and Shimla are under severe ecological stress.

Problem Statement:
Develop a sustainable tourism framework for Himachal Pradesh. Your solution should emphasize eco-tourism practices, strict waste management, limits on tourist inflow, community-based tourism, and green infrastructure development.

Case Study 9 : **Tea Industry and Deforestation in Assam**
Assam's tea industry is world-famous, but large-scale plantations have led to deforestation, soil erosion, and biodiversity loss. Plantation workers also face poor living conditions and limited wages.
Problem Statement:
Propose a sustainable tea industry framework in Assam. Your model should integrate eco-friendly plantation methods, better worker welfare policies, agroforestry practices, and fair-trade certifications to balance ecology with economy.

Case Study 10 :
Textile Waste & Fast Fashion in India
India's booming fashion industry has led to rising textile waste, much of which ends up in landfills or is burned, releasing harmful emissions. At the same time, traditional artisans and weavers struggle to sustain livelihoods due to lack of demand for sustainable fabrics.
Problem Statement:
Propose an innovative approach to reduce textile waste while promoting sustainable fashion. Your solution should integrate circular economy principles, promote eco-friendly alternatives, and create opportunities for India's artisan communities.

Case Study 11:
Sustainable Mobility for Tier-2 Cities
Indian Tier-2 cities like Indore, Lucknow, and Jaipur are experiencing rapid urbanization and rising vehicle ownership. This has led to traffic congestion, rising fuel consumption, and worsening air pollution. While metros have invested in public transport, smaller cities lack such infrastructure.
Problem Statement:
Propose a sustainable urban mobility strategy for Tier-2 Indian cities. Consider affordable EV adoption, shared mobility solutions, cycling/pedestrian infrastructure, and government incentives to make transportation both accessible and eco-friendly

Case study 12:
Cyclone Vulnerability in Odisha and West Bengal
Eastern coastal states like Odisha and West Bengal frequently face cyclones (e.g., Cyclone Fani, Amphan). These cause loss of lives, infrastructure damage, and long-term livelihood challenges for coastal communities.

Problem Statement:
Develop a cyclone-resilient infrastructure plan for East India. Your solution should include stronger coastal defenses, disaster-resilient housing, evacuation networks, mangrove restoration, and early warning systems.

Case Study 13:
Affordable Green Housing under PMAY
India's Pradhan Mantri Awas Yojana (PMAY) aims to provide affordable housing for all, but most construction practices are resource-intensive, generating huge carbon footprints and construction waste.
Problem Statement:
Suggest sustainable construction practices and materials (e.g., fly-ash bricks, bamboo, recycled materials) that can be integrated into affordable housing projects under PMAY. Ensure your solution is low-cost, durable, and suitable for India's diverse climates

Case study 14:
Chhattisgarh's Solar-Powered Schools (2016–Present)
In remote tribal regions of Chhattisgarh, lack of electricity disrupted children's education. A state-led initiative introduced solar-powered schools, improving learning outcomes. However, maintenance and scaling remain challenges.
Problem Statement:
How might we scale renewable energy solutions in rural India to provide reliable electricity for education, healthcare, and livelihoods?

Case study 15:
Case Study : Rural Sanitation & Plastic Toiletries Waste
Background: Rural sanitation initiatives have increased toilet coverage, but improper disposal of plastic hygiene products contaminates soil and water.
Problem Statement: Design sustainable, biodegradable alternatives or waste management systems for hygiene products in rural areas.

Case Study 16:
Food Packaging Waste in E-Commerce
India's booming e-commerce sector (Amazon, Flipkart, Meesho, etc.) generates massive plastic and cardboard waste from packaging. Current recycling systems are unable to cope with this surge.
Problem Statement:
Develop a sustainable packaging and reverse logistics strategy for Indian e-commerce companies, focusing on biodegradable materials, consumer awareness, and circular economy models

Case Study 17:

Glacial Lake Outburst Floods (GLOFs)

The Imminent GLOF Threat in the Himalayas

As climate change accelerates glacial melt, unstable lakes are forming at high altitudes in the Himalayas. These lakes, dammed by fragile moraine walls, can breach suddenly, causing catastrophic Glacial Lake Outburst Floods (GLOFs) that wipe out downstream villages and infrastructure. Communities in states like Uttarakhand live under constant threat with inadequate warning systems.

Problem Statement:

Develop an integrated, low-cost GLOF early warning and disaster mitigation system for a vulnerable Himalayan valley. Your plan must combine remote sensing with on-site IoT sensors for lake monitoring, create a community-managed communication protocol for rapid evacuation, and propose bio-engineering methods to safely manage dangerous lakes.

Case Study 18:

Urban Heat Islands in Indian Cities

Cities like Ahmedabad, Hyderabad, and Mumbai are witnessing rising urban temperatures due to concrete growth, loss of green cover, and climate change, creating urban heat islands.

Problem Statement:

Develop strategies such as green roofing, urban forestry, reflective building materials, and city planning to mitigate heat islands in Indian metros.

Case study 19:

Dengue & Urban Waste Accumulation

Background: Dengue outbreaks are rampant in many Indian cities due to stagnant water in plastic waste, construction sites, and clogged drains. Climate change and urbanization worsen the breeding conditions for mosquitoes.

Problem Statement:

How might we develop sustainable, low-cost solutions to prevent vector-borne diseases like dengue by addressing environmental factors such as water stagnation and waste accumulation?

Case Study 20:

Energy Efficiency in Indian Railways

Indian Railways is the world's fourth-largest rail network, consuming vast amounts of diesel and electricity. While there are initiatives toward electrification and solar adoption, efficiency gaps remain.

Problem Statement:

Suggest an action plan to make Indian Railways more energy-efficient and environmentally sustainable through renewable adoption, smart energy management, and green infrastructure

Case Study 21:

Clean Cooking for Rural Households (Bihar)

In districts like Gaya and Nalanda, firewood, crop residues, and cow dung are widely used in “chulhas.” This causes indoor air pollution, leading to respiratory diseases, eye irritation, and higher health risks for women and children. Although programs like Pradhan Mantri Ujjwala Yojana (PMUY) have increased LPG connections, affordability, irregular supply, and adoption challenges prevent many families from switching to cleaner alternatives.

Problem Statement:

Many rural households in Bihar still rely on traditional biomass stoves for cooking, exposing families to serious health risks and environmental degradation.

Case Study 22 :

Sustainable Nuclear Energy in India

India’s nuclear plants like Kudankulam and Tarapur provide low-carbon, high-density electricity, but challenges remain in waste management, safety, and long-term sustainability.

Problem Statement

How can India expand nuclear energy sustainably while ensuring safe waste disposal, minimizing environmental risks, and supporting long-term low-carbon goals?

Case study 23:

Sustainable Health Care in India

India’s healthcare system faces high patient loads, especially in rural areas. AI diagnostics, telemedicine, and mobile health units (e.g., Apollo TeleHealth, eSanjeevani) improve access but can be resource-intensive. Sustainable healthcare requires low-cost, energy-efficient, and scalable solutions that reach underserved populations.

Problem Statement

How can India implement sustainable healthcare solutions that are cost-effective, energy-efficient, and scalable to improve access and quality in rural and semi-urban areas?

Case study 24:

Garbage Mountains in Delhi (Ghazipur, Bhalswa, Okhla)

Context: Ghazipur landfill, as tall as a 17-story building, frequently catches fire. Waste segregation at source is minimal, and only ~30% of Delhi’s waste is processed.

Problem Statement:

Delhi’s landfill sites have grown into massive garbage mountains, polluting air, soil, and groundwater.