NITI Aayog | ATAL INNOVATION MISSION

Shell NXplorers

LEARNING LINKS FOUNDATION
WHERE EDUCATION MEETS LEARNING

Igniting Innovation | Empowering Changemakers

Food

Water

Energy

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A New Way Of Thinking.

Shell NXplorers introduces young people to complex and creative thinking skills needed to bring about sustainable change.

Learn more at **NXplorers.com**

Message from Mission Director of Atal Innovation Mission (AIM), NITI Aayog, Government of India

Mr Deepak Bagla

India's development journey rests not only on the strength of its institutions and policies but also on the ingenuity and aspirations of its people, especially its youth. At AIM, NITI Aayog, we believe that nurturing innovation and fostering problem-solving skills from a young age is essential to building a more sustainable, inclusive, and resilient future.

The NXplorers program, supported by Shell and implemented by the Learning Links Foundation, is closely aligned with the Atal Innovation Mission's efforts to foster a culture of innovation and entrepreneurship across the country and exemplifies how education can become a catalyst for real-world impact. With its focus on the critical domains of food, water, and energy, the program empowers young minds to approach local challenges through a global lens, applying structured methodologies and leveraging cutting-edge technologies available in Atal Tinkering Labs to design practical, sustainable solutions that resonate deeply with India's developmental priorities.

This coffee table book is a powerful reflection of that spirit. It showcases 55 exemplary student-led projects, each born out of curiosity and driven by a commitment to improve lives. These initiatives are not just academic exercises, they are early blueprints for grassroots innovation and sustainable development.

I am particularly heartened by the program's outreach to underserved and rural communities, where it is helping democratize access to transformative STEM learning. Through professional development trainings and hands-on mentorship, the NXplorers program have introduced a powerful new dimension to the Atal Tinkering Labs ecosystem. ATL educators, equipped with these tools, have become true enablers of change, mentoring students to think boldly, act ethically, and innovate inclusively.

My congratulations to Shell, the Learning Links Foundation, and the Atal Innovation Mission team for this meaningful collaboration. Most importantly, I commend the students whose ideas and initiatives are featured in these pages. They represent the spirit of India we aspire to build. Let this collection be a celebration of the immense potential that lies within every young mind when empowered to explore, imagine, and lead.

Message from Chairman, Shell Group of Companies India and Senior Vice President, Shell Lubricants Asia Pacific

Ms Mansi Tripathy

At Shell, we believe the future belongs to those who are prepared for it. Our commitment to empowering the next generation of professionals and leaders is deeply rooted in this belief. Through NXplorers – our global flagship educational program – we are equipping young minds with the critical thinking, problem-solving, and systems thinking skills they need to thrive in a rapidly evolving world.

NXplorers focuses on the vital nexus of food, water and energy - three pillars central to the United Nations Sustainable Development Goals. Our collaboration with NITI Aayog's Atal Innovation Mission (AIM) has significantly amplified the program's reach and impact. By integrating NXplorers' systems thinking approach with the cutting-edge tools and resources of Atal Tinkering Labs, we are nurturing a generation of changemakers ready to shape a more inclusive, lower carbon future.

It is with immense pride that I present this coffee table booklet—a celebration of creativity, ingenuity, and the boundless potential of India's youth. The 55 featured projects, developed by students from

government and low-income schools, are not only innovative but also deeply aligned with the vision of Viksit Bharat. They stand as powerful examples of how education and innovation can drive meaningful, lasting change.

We extend our heartfelt gratitude to Atal Innovation Mission (AIM) and the Learning Links Foundation for their invaluable partnership, and to the dedicated government teachers whose unwavering commitment continues to strengthen India's innovation ecosystem and advance the nation's aspirations for 2047.

Young people have the power to transform the world. Through NXplorers, we are proud to support them on this journey – helping them turn their ideas into actions and aspirations into opportunities.

Message from Founder & Chairperson, Learning Links Foundation

Dr. Anjlee Prakash

It is our belief in the potential of young minds to drive sustainable change that fuels our commitment to nurturing future-ready innovators. Rooted in the shared goals of developing real-world problem-solving skills and fostering a strong STEM mindset, the Shell NXplorers program continues to transform education into a powerful catalyst for meaningful change.

Conceptualised by Shell and implemented by the Learning Links Foundation, the NXplorers program places innovation and systems thinking at the heart of learning. It empowers students to design practical, sustainable solutions in the areas of food, water and energy. Through this approach, students engage deeply with global challenges, developing critical thinking, collaboration and creativity skills. The program fosters an environment where curiosity leads to action and ideas evolve into impactful solutions— especially in underserved rural and government schools.

The program deepened its impact in 2023 through a collaboration with Atal Innovation Mission, NITI Aayog. This partnership enabled us to engage and empower ATL coordinators through NXplorers professional development workshops designed to strengthen their capabilities. These educators now serve as ambassadors of innovation, guiding students to become positive agents of change.

I am pleased to provide a foreword to this coffee table book, which captures 55 student-led projects that embody the spirit of NXplorers. Through compelling visuals and heartfelt stories, the book celebrates the creativity, resilience and commitment of students who are reimagining a better world.

We are proud to be associated with AIM, NITI Aayog and Shell and extend our sincere appreciation for their steadfast support in nurturing tomorrow's changemakers. A special note of gratitude to the dedicated ATL coordinators and LLF facilitators who mentor and inspire these young innovators—your efforts are central to bringing the NXplorers vision to life. Above all, we thank the students whose curiosity, creativity and commitment continue to drive this journey forward.

I would like to thank all contributors and stakeholders who have been part of this inspiring journey. We look forward to seeing the program continue to empower young minds in the years to come.

We remain committed to scaling this transformative initiative and strengthening its impact in the years ahead.

Atal Innovation Mission, NITI Aayog

The Atal Innovation Mission (AIM), NITI Aayog, is the Government of India's flagship initiative, launched in 2016 to promote a culture of innovation and entrepreneurship across all levels, from school to space. It focuses on catalysing the foundational building blocks of the innovation ecosystem, supporting entrepreneurs, and facilitating deep-tech startups. As part of this mission, Atal Tinkering Labs (ATLs) have been set up in thousands of schools across India to provide students with hands-on experience in STEM learning, robotics, artificial intelligence (AI), Internet of Things (IoT) and 3D printing. These labs encourage young minds to explore real-world problem-solving through design thinking and prototyping, fostering a maker culture in education.

NITI Aayog, the National Institution for Transforming India, is the premier policy think tank of the Government of India, established in 2015 to drive economic growth and development. It fosters cooperative federalism, encourages innovation-driven policies, and promotes a knowledge-based economy. The objective of NITI Aayog is to position India as a leading nation on the global stage, creating solutions not only for India but for the world. Recognising the need for a robust innovation ecosystem, NITI Aayog launched the Atal Innovation Mission (AIM) to cultivate entrepreneurship, scientific temperament and problem-solving skills across the country.

For entrepreneurs and startups, AIM has established Atal Incubation Centres (AICs), which provide funding, mentorship and industry support to early-stage ventures in deep-tech and sustainable solutions. Additionally, the Atal New India Challenges (ANICs) focus on technology-based innovations to solve national and global challenges in sectors such as agriculture, healthcare, energy and waste management. Atal Community Innovation Centres (ACICs) extend innovation support to rural and semi-urban areas, ensuring inclusive growth by empowering local entrepreneurs and social innovators.

AIM also drives collaboration and mentorship through the Mentor India Initiative, connecting industry leaders, entrepreneurs and subject matter experts with students and startups. The ARISE (Atal Research & Innovation for Small Enterprises) program fosters R&D-driven solutions for MSMEs and industrial challenges, bridging the gap between industry needs and technological advancements.

Over the years, AIM has established 10,000+ Atal Tinkering Labs and 75+ Atal Incubation Centres, impacting over 1 crore students and engaging researchers and entrepreneurs. It continues to expand its reach, ensuring inclusive and sustainable innovation across India. With a strong emphasis on public-private partnerships, AIM envisions a future where India leads in global innovation and entrepreneurship, empowering the next generation to create scalable, impactful solutions for a better tomorrow.

The Atal Innovation Mission works towards the vision of the Hon'ble Prime Minister to make India future-ready. For the Mission, the Future is Now.

Shell & Shell NXplorers Program

At Shell, we believe in the power of innovation, collaboration and sustainability to shape a better future. As a global energy leader, Shell is committed to addressing the world's growing energy demands while striving for a lower-carbon, sustainable future. With a strong focus on responsible energy production, cutting-edge technology and environmental stewardship, Shell continuously works towards delivering cleaner, smarter and more efficient energy solutions that drive progress and empower communities.

One of Shell's key global initiatives, NXplorers, reflects our commitment to nurturing STEM education and systems thinking. Shell NXplorers Global is a transformative program designed to equip young minds with the critical thinking, problem-solving and innovation skills needed to address complex global challenges. By encouraging students to explore food, water and energy interdependencies, the program empowers them to develop sustainable solutions that create real impact.

Launched across multiple countries, NXplorers has reached thousands of students, educators and change-makers worldwide over twenty countries, fostering a culture of creativity, collaboration and innovation. The program integrates systems thinking, scenario planning and theory of change methodologies, enabling students to think beyond conventional solutions and implement ideas that drive positive environmental and social change.

In India, the NXplorers program has been instrumental in inspiring young innovators, educators and communities to tackle real-world sustainability challenges. Through hands-on projects, mentorship and global collaborations, students are redefining the future of energy, water conservation and agriculture. The program's impact extends beyond classrooms, shaping future leaders, responsible entrepreneurs and sustainability champions.

As we move forward, Shell remains dedicated to fostering innovation, education and sustainability. By empowering the next generation of problem-solvers, Shell NXplorers Global continues to be a catalyst for change and progress, helping build a world where energy, resources and technology work in harmony to create a more sustainable and resilient future for all.

Learning Links Foundation

Learning Links Foundation, founded in 2002, is a non-profit organisation dedicated to enriching lives through learning. With a vision to foster purpose and progress by unlocking lifelong learning and with a mission of transforming learning at every lifecycle to optimize potential and opportunity.

Our education, training and skill-building solutions create lifelong learning opportunities for all age groups and communities, using knowledge, innovation and technology.

ISO 9001 2015 CERTIFIED

Education Solutions

Activate the learning gene

- Focus on learning with understanding by building foundational skills in students
- Bridge the learning gap
- Empower students holistically
- Upskill educators professionally
- Drive systemic change with education stakeholders

Technology & Innovation

Empower future-ready minds

- Build digital citizenship skills for the 21st century
- Promote innovation and create changemakers
- Cultivate a human-centred design thinking approach to spark creativity, innovation and a growth mindset

Skill Building & Entrepreneurship

Maximise potential

- Nurture aspirations and build self-reliance
- Build job-ready skills, financial literacy skills and entrepreneurial acumen

Research & Development

Collaborate with a purpose

- Work closely with various institutions and organisations to tackle key education issues
- Advocate for improvements in education practices and policies to foster systemic change

Our Reach

*Reach in 2024-25

Students **11,57,567**

Schools **6,683**

Teachers **35,480**

Principals **3,769**

Community Members **50,06,669**

Youth **1,96,423**

Women **5,38,089**

Volunteers **24,949**

Jammu and Kashmir, Ladakh (Leh), Himachal Pradesh, Haryana, Punjab, Uttarakhand, Sikkim, Rajasthan, Delhi, Chandigarh, Bihar, Nagaland, Uttar Pradesh, Assam, Madhya Pradesh, Tripura, Meghalaya, West Bengal, Gujarat, Chhattisgarh, Jharkhand, Maharashtra, Odisha, Telangana, Goa, Karnataka, Andhra Pradesh, Kerala, Tamil Nadu
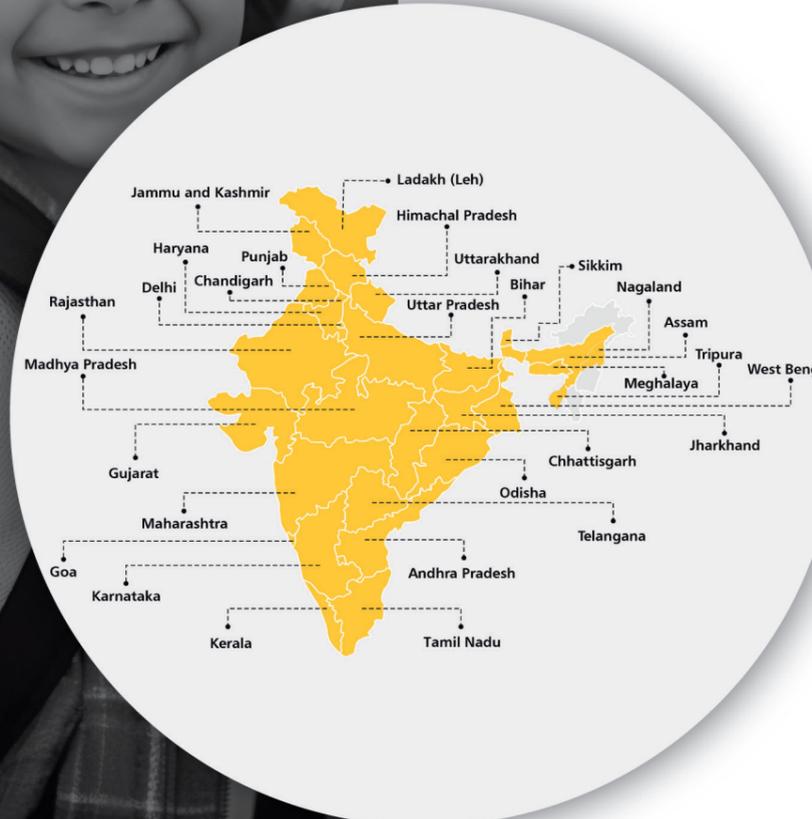
Collaboration: Shell NXplorers and Learning Links Foundation

On 12th June 2018, a landmark agreement was signed between Learning Links Foundation (LLF) and Shell India to bring the NXplorers program to India. This collaboration marked a significant step towards fostering STEM education, sustainability awareness and problem-solving skills among young minds across the country. The signing of the Memorandum of Understanding (MoU) symbolized a shared vision between Shell and LLF to equip students with critical thinking, innovation and problem solving skills—essential for addressing real-world challenges in food, water and energy sustainability.

The MoU exchange took place between Learning Links Foundation and Shell Companies in India. This momentous occasion laid the foundation for a long-term collaboration aimed at empowering students, educators and communities through experiential learning, hands-on STEM projects and sustainable innovation. With a strong focus on systems thinking and interdisciplinary problem-solving, the program was introduced in schools across the country, inspiring students to rethink challenges, design innovative solutions and develop a mindset of sustainability.

Since its inception in India, Shell NXplorers has impacted thousands of students and educators, equipping them with tools to analyze global issues through a structured problem-solving approach. The program integrates Shell's global expertise in energy, technology and sustainability with LLF's experience in education transformation and skill development. Together, Shell and LLF have successfully nurtured a generation of young innovators, ensuring that they think critically, collaborate effectively and develop solutions for a sustainable future.

Today, under the leadership of Ms. Mansi Tripathy, the current Chairperson of Shell India Pvt Ltd, the NXplorers program continues to grow and expand its reach. The journey that began with the MoU signing in 2018 remains a testament to the power of strategic partnerships, shared vision and impactful education programs, driving a more sustainable and resilient future for the next generation.

NXplorers

The NXplorers program is an innovative global education program developed by Shell. NXplorers program introduces young people to the complex and creative thinking required to bring about positive change.

As the world population increases, so does our need for resources such as food, water and energy. These systems depend heavily on each other.

NXplorers program takes many of its ideas from the disciplines of systems thinking, scenario planning and theory of change. This integrated approach, known as NXthinking, equips young people with the mindset and tools to tackle the challenges linked to the Sustainable Development Goals (SDGs).

The program operating in over 20 countries, including India enables students aged 11 to 14 to unlock the STEM (Science, Technology, Engineering and Mathematics) habits of minds in young people, thereby equipping them with tools and skills to critically identify and solve complex problems driving positive change in an interconnected world.
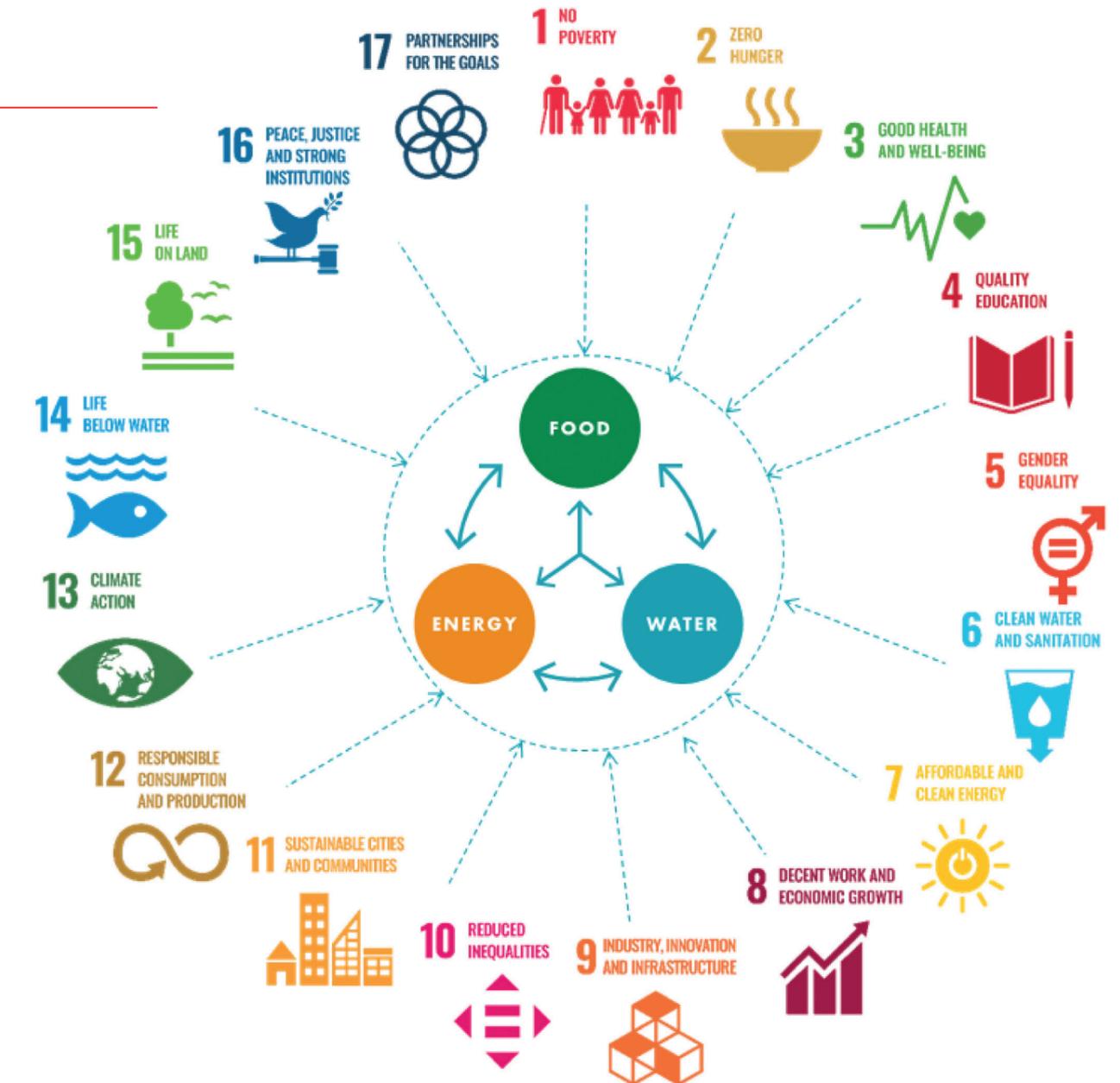
Shell NXplorers Journey

NXplorers Juniors is designed to introduce students of grades 6 and 7 to the world of problem-solving using science, technology and creativity. It simplifies the NXplorers concepts through age-appropriate, activity-based learning that builds critical thinking, teamwork and awareness of sustainability from an early stage. Students explore global challenges linked to the United Nations Sustainable Development Goals (SDGs) and learn how their ideas can help shape a better future.

The following are the six stages which the students would explore:

Inspire: Discover the UN Global Goals and understand how individual actions can contribute to a sustainable future.

Amaze: Explore inspiring inventions and innovations that are already addressing global challenges.

Create: Build a simple windmill model that demonstrates how renewable energy can be used to lift and move objects.

Research & Invent: Choose a global goal, formulate a key question and brainstorm creative ideas to solve real-world problems.

Choose & Develop: Select the most impactful idea and further develop it into a practical solution.

Present: Share the final NXplorers Junior idea with peers and present it to a panel, showcasing innovative thinking and teamwork.

In essence, NXplorers Juniors is the first step in nurturing young minds to become future changemakers and confidently progress to the main NXplorers program.

Step - 3
Create

Step - 4
Research & Invent

Step - 2
Amaze

Step - 5
Choose & Develop

Step - 1
Inspire

Step - 6
Present
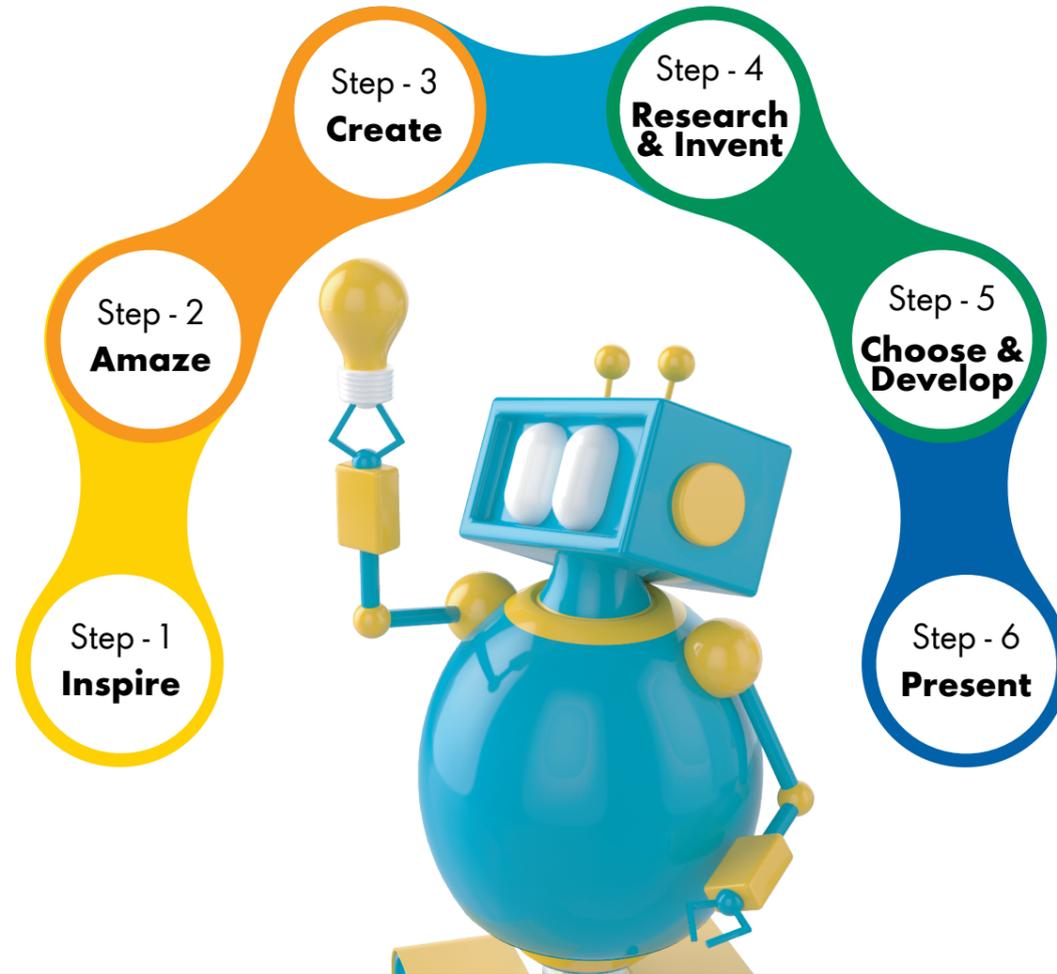
A New Way of Thinking

The NXplorers program engages secondary and higher secondary students who can apply systems thinking and project development skills. Its curriculum has three stages that integrate systems thinking, scenario planning and the theory of change, supported by guiding questions, tools and resources. These help students explore real-world challenges and design sustainable solutions.

NXthinking is built on five key approaches:

The Big Picture: Taking a step back to view the entire situation from multiple angles, gaining a broader understanding of the issue and its context.

Connections: Identifying the relationships, patterns and interactions between different factors to understand how they influence and impact one another.

Perspectives: Considering diverse viewpoints and understanding the needs, priorities and values of different stakeholders.

The Future: Exploring multiple possible futures and envisioning the most desirable and achievable one.

Change: Developing practical, actionable strategies to turn the preferred future into reality.

To create a positive future, we need teamwork, the right guidance and a strong belief in change.

The Big Picture

Change

Connections

The Future
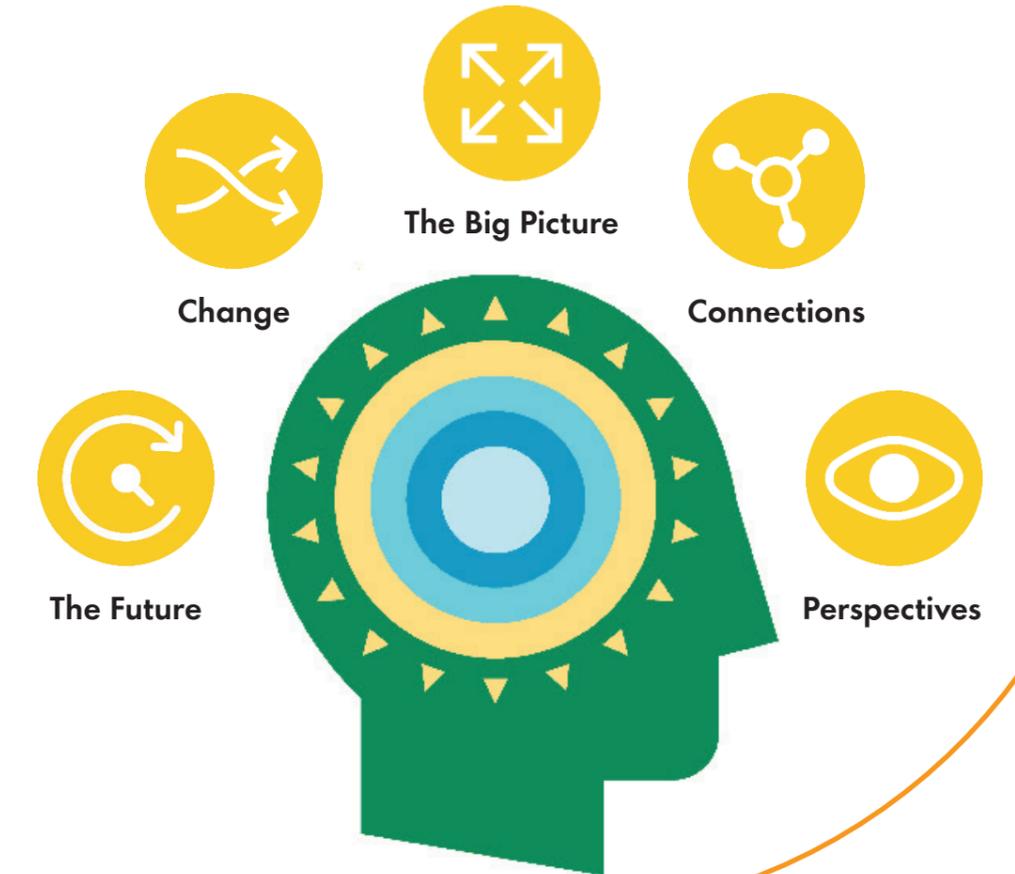
Perspectives

NXplorers Framework

EXPLORE: In the first stage, students focus on understanding the problem before finding solutions. They use three tools – Problem Statement to define the issue, Connections Circle to map relationships and Perspectives Circle to study stakeholder views. These help identify root causes and see the bigger picture.

CREATE: After understanding the issue, students imagine possible futures using the Scenario Planning Quadrant. They explore what happens if nothing changes, what actions can bring change and what their preferred future looks like. This helps generate innovative ideas for real-world impact.

CHANGE: In the final stage, students plan action using the Feasibility Funnel, Ripple Effect and Persuasion Pyramid tools to refine ideas, assess impact and create effective implementation strategies.

EXPLORE
- What is the issue?
- What's causing the issue?
- How can we dig deeper into the issue?

CREATE
- What would happen if nothing changed?
- What actions could bring about change?
- What is our preferred future?

CHANGE
- What action can lead to our preferred future?

PROBLEM STATEMENT	CONNECTIONS CIRCLE	PERSPECTIVES CIRCLE
CHANGE OVER TIME	SCENARIO PLANNING	IDEAS
FEASIBILITY FUNNEL	RIPPLE EFFECT	PERSUASION PYRAMID
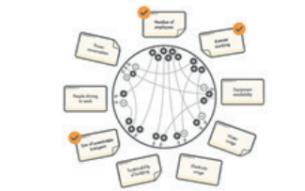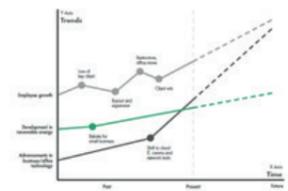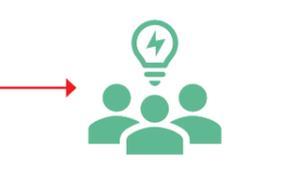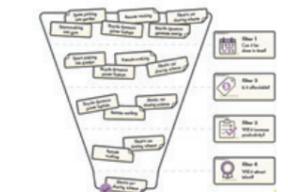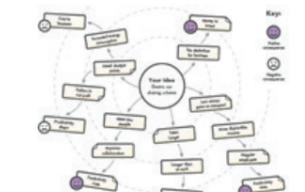
Shell NXplorers Impact & Reach

Shell NXplorers by Learning Links Foundation

The collaboration between Shell and LLF embarked on its journey in 2018, marking the inception of NXplorers program in India. Since its inception, Learning Links Foundation has been implementing the interactive curriculum of the Shell NXplorers program in five states of India: Delhi, Gujarat, Maharashtra, Karnataka and Tamil Nadu and has reached out to approximately 4 lakh student beneficiaries and 3000 plus teachers.

3,113 Teachers
3,032 Schools

01 — 3,87,227 Students
02
03 — 5 States in India
04
05 — 2,520 Projects

Delhi
Gujarat
Maharashtra
Karnataka
Tamil Nadu
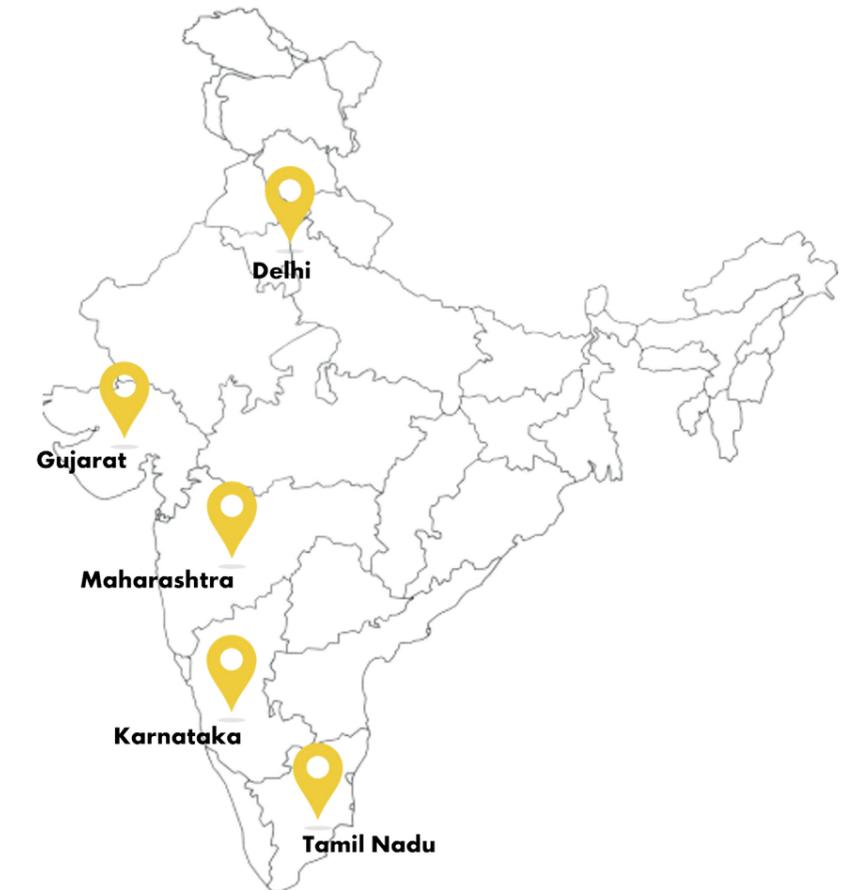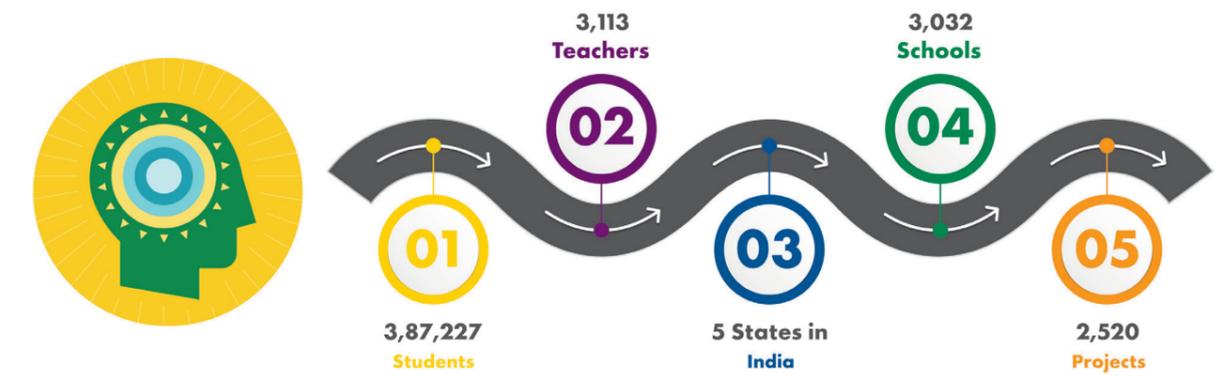
The Collaboration of AIM, NITI Aayog, Shell and LLF

Combining the expertise of NXplorers in problem-solving methodologies and the cutting-edge technology available at ATLs, blossoming to create game changing & Sustainable solutions.

ATL Cutting Edge Technologies + **NXplorers Methodology** = **Game Changing & Sustainable Solutions**
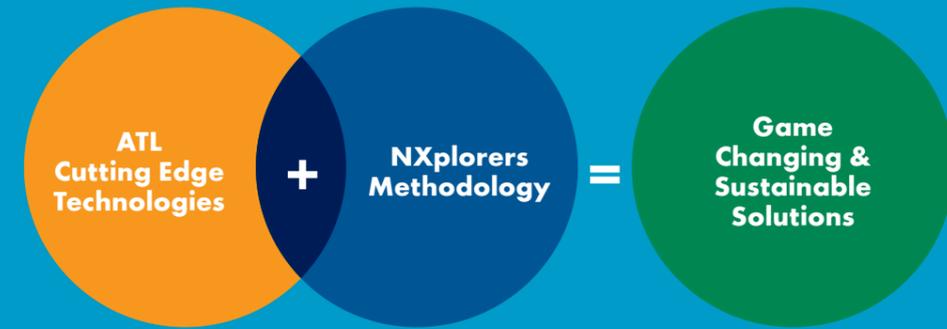
In 2023-24, a strategic collaboration was forged to enhance STEM education in Atal Tinkering Lab (ATL) schools across India. This partnership brought together NITI Aayog's Atal Innovation Mission (AIM), Shell NXplorers and Learning Links Foundation, with a shared commitment to empowering students with critical thinking, problem-solving and innovation skills.

As part of this initiative, Shell NXplorers professional development training was conducted by Learning Links Foundation for ATL Coordinators, equipping them with the knowledge and tools necessary to guide students in exploring STEM concepts, developing prototypes and applying systems thinking to real-world problems. These Shell NXplorers training sessions ensured that educators could effectively mentor young innovators, fostering a culture of creativity and scientific inquiry.

At the heart of this collaboration lies a powerful vision—to inspire young minds to tackle pressing challenges related to food, water and energy sustainability through innovative thinking. By integrating experiential learning and design thinking, students are encouraged to develop solutions that contribute to a more sustainable and resilient future.

To Celebrate the impactful initiative, a grand Celebration event took place on 3rd April 2024, bringing together key stakeholders from Atal Innovation Mission, NITI Aayog, Shell NXplorers and Learning Links Foundation. This event highlighted the transformative impact of STEM education, showcased student-led innovations and reaffirmed the commitment to fostering the next generation of scientists, engineers and change-makers.

Shell NXplorers Impact Through AIM, NITI Aayog Collaboration

3
States

255
ATL Schools Impacted

32
NXplorers Training Conducted

563
ATL Coordinators Trained

333
M & E Visit conducted

871
NXplorers Workshops Delivered
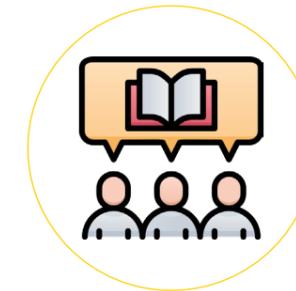
37,428
Students Impacted
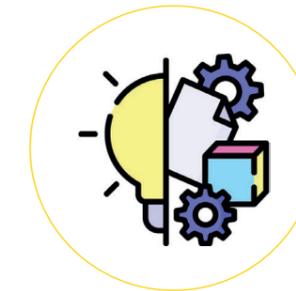
457
NXplorers Change Projects created

1
Celebration Event

3
NXplorers ATL Science Carnival

Bio Bloom Investigator

How Can We Protect Marine Biodiversity to Safeguard Coastal Ecosystems and Livelihoods?

School Name:
Modern School & Junior College, Vashi, Navi Mumbai

The Koli community in Maharashtra, which deeply relies on fishing for their livelihood, faces a growing crisis due to industrial waste-induced algal blooms.

These rapid and excessive algae growths disrupt marine ecosystems, creating dead zones, obstructing boat movement and increasing fuel and maintenance costs for the community. Algal blooms are rapid and excessive growths of algae in aquatic environments, particularly in freshwater bodies like lakes, rivers and ponds, as well as in marine environments. The harmful algal blooms (HABs) pose significant environmental and economic threats, impacting marine biodiversity and human activities alike.

Alarmed by this growing environmental threat and Inspired by the Shell NXplorers workshop conducted by Learning Links Foundation, the students from Modern School, Vashi, took on this challenge. Using NXplorers tools, they analyzed stakeholder perspectives, identified key challenges and envisioned a sustainable solution to mitigate water pollution and restore marine biodiversity.

Through structured ideation and feasibility analysis, they developed the Bio Bloom Investigator, an innovative robotic solution designed to combat harmful algal blooms effectively.

> " Nurturing Aquatic Life, Securing Sustainable Futures. "

Solution

The Bio Bloom Investigator is a robotic machine equipped with advanced sensors and Raspberry Pi technology. It is designed to detect, segregate and extract harmful algae while preserving beneficial species. Additionally, it harnesses collected algae for the production of biofuels, cosmetics and other valuable products, contributing to a circular economy.

Conclusion

With continued research and collaboration, these young changemakers strive for a sustainable future for both fishermen and marine life. The Bio Bloom Investigator restores biodiversity, mitigates harmful algal blooms and transforms extracted algae into biofuels, bioplastics and cosmetics, creating sustainable economic opportunities. This initiative showcases the power of innovation and teamwork in ensuring a healthier ocean and thriving communities.

Scan the QR code and watch the video

BioBot EEG: Tracking Plant Health

How Can We Address Plant Health Challenges to Improve Agricultural Yield?

School Name:

Euro High School, Kamrej, Surat

Across the globe, farmers face a silent crisis—plants under constant stress from pests, diseases and harsh environmental conditions. These invisible threats can reduce crop yields by up to 16%, impacting food security, farmer income and long-term sustainability.

The core challenge? Plants can't communicate their distress in ways we easily understand. Most farmers lack the tools to detect early signs of stress and by the time visible symptoms emerge, it's often too late—making intervention reactive, expensive and less effective.

Motivated to bridge this gap, students of Euro High School, guided by the NXplorers methodology, developed an innovative solution—Bio Bot EEG.

" When Plants Speak, We Listen. "

Solution

BioBot EEG is a breakthrough plant biofeedback system that gives crops a voice. Using responsive plants like Mimosa pudica, the device captures real-time bioelectrical signals to detect early signs of stress caused by pests, disease, or environmental factors.

The system includes:

- Electrode Sensors to detect subtle electrical signals from plant leaves
- Bio-Amplifier Circuit to boost weak signals
- Signal Processor to analyze stress patterns
- Real-Time Dashboard for instant alerts to farmers

By identifying plant stress before visible symptoms appear, BioBot EEG enables early intervention, reduced chemical use and higher yields—advancing smart, sustainable farming with insights straight from the plants themselves.

Conclusion

The BioBot EEG empowers farmers with a sixth sense—allowing them to "hear" what their plants are feeling. This groundbreaking interface between biology and technology opens a new frontier in smart agriculture. By acting as an early warning system, the BioBot EEG helps prevent yield loss, reduce dependence on harmful chemicals and build resilience into food systems.

Looking ahead, the team aims to enhance BioBot EEG with wireless connectivity, AI-driven predictions and crop-specific signal libraries—bringing precision and scalability to smart farming.

PomEco Wraps

How Can We Reduce Food Waste During Storage and Distribution to Improve Food Availability and Resource Efficiency for Farmers and Consumers?

School Name:
Government Muslim Higher Secondary School, Triplicane, Chennai

The NXplorers workshop gave students of Government Muslim Higher Secondary School the tools and a platform to think critically about real-world challenges. Through systems thinking and creative problem-solving, they began exploring the interconnected issues of food waste, plastic pollution and environmental sustainability.

In India and many parts of the world, large quantities of food go to waste due to poor storage and the widespread use of unsustainable plastic packaging. Perishable goods often spoil before reaching consumers, resulting in economic loss, heightened food insecurity and increased environmental pressure.

Driven by the insights gained during the workshop, the students turned their attention to the need for biodegradable alternatives that could preserve food while reducing ecological harm. This led to the creation of PomEco Wraps—a natural, eco-friendly packaging solution designed to extend the shelf life of produce while cutting down on plastic dependency.

> " Wrap Fresh, Waste Less, Save the Planet. "

Solution

PomEco Wraps—biodegradable and edible food wraps—are made using pomegranate peel extract, tapioca starch, fenugreek seeds and natural plasticizers like PVA. By repurposing food waste such as pomegranate peels, this solution not only addresses packaging challenges but also promotes circular use of organic materials. The wraps are durable, non-toxic and capable of extending the shelf life of fruits, vegetables and other perishables.

Unlike traditional plastic packaging, PomEco Wraps are eco-friendly, cost-effective and safe for food contact, offering a sustainable alternative for food storage. Their simple production process makes them accessible to food distributors, vendors and everyday consumers aiming to reduce food waste and avoid plastic use.

Conclusion

PomEco Wraps offer a smart, sustainable way to reduce food spoilage and plastic use. By extending freshness and minimizing waste, they support both food security and environmental sustainability—benefiting both communities and the planet.

UVita Panel

How Can We Ensure Consistent and Affordable Renewable Energy Generation for Communities in Regions Where Existing Systems are Inefficient or Costly?

School Name:
Salwan Boys Senior Secondary School, Old Rajinder Nagar, New Delhi

India's electricity demand is projected to double by 2040, yet nearly 230 million citizens still lack access to reliable power. While solar energy plays a vital role in the nation's renewable transition, conventional solar panels face a major limitation — they depend on direct sunlight, losing efficiency in cloudy, shaded, or densely populated urban areas. Their high installation costs and large space requirements further restrict adoption, particularly in rural and low-income regions. Moreover, these systems fail to capture the abundant ultraviolet (UV) light scattered across India's atmosphere, leaving a vast source of potential energy untapped.

To address these challenges, the students of Salwan Boys Senior Secondary School, Delhi have developed an innovative idea named UVita Panel, which proposes upcycling organic waste into a material capable of absorbing UV light and converting it into usable electricity in their ATL Lab. This concept envisions providing a low-cost, consistent and sustainable power source for vulnerable communities that still rely on diesel or rationed electricity.

" When Sunshine Fades, UVita invades — Power That Never Fades! "

Solution

The UVita Panel directly addresses the weather and urban limitations of conventional solar power by harnessing ultraviolet (UV) light which easily penetrates clouds and shaded environments. The core innovation lies in the panel's eco-friendly structure. Pigments extracted from fruit and vegetable waste such as chlorophyll and carotenoids are infused into a resin mixture. This specialized mixture acts as a Luminescent Solar Concentrator (LSC) that effectively absorbs UV light. Once absorbed, the energy is re-emitted as visible light which is then directed and captured by photovoltaic cells integrated along the panel edges to generate electricity consistently and reliably.

The panel is enclosed in a lightweight biodegradable bamboo frame to reduce the overall carbon footprint. The system also includes a UV sensor (GUVA-S12SD) that enables real-time monitoring of UV intensity and panel performance making the UVita Panel a sustainable, verifiable and versatile energy innovation suitable for walls, facades and vehicles.

Conclusion

UVita Panels represent a ground-breaking advancement in sustainable energy management by directly solving the problems of efficiency, durability and environmental impact inherent in traditional photovoltaics. Converting organic waste into a high-performance, weather-resilient power source, the project embodies a critical step towards clean energy and circular economy practices globally.

Future scope of this idea includes integrating battery storage for off-grid use, developing a scalable, automated resin casting process using industrial organic waste streams and deploying specialized facade mounting systems for high-rise urban structures to maximize widespread renewable energy adoption. This technology reflects a deep commitment to clean energy adoption and inspires collective responsibility.

Tempest Tech Turbine

How Can We Improve Power Reliability Across All Weather Conditions to Support Households, Agriculture and Essential Services?

School Name:
Salwan Girls Senior Secondary School, Rajinder Nagar, New Delhi

Severe weather events—like storms and heavy snowfall—often leave communities in the dark, disrupting daily life and critical services. From heating to communication, power outages create ripple effects that challenge safety and resilience. Traditional power grids, vulnerable to physical damage and slow to recover, are no match for the unpredictability of extreme weather.

Through the Shell NXplorers program conducted by Learning Links Foundation, students from Salwan Girls Senior Secondary School, New Delhi, explored innovative ways to address power disruptions. The group of students focused on creating a wind energy solution through the Atal Tinkering Lab available in the school. This solution adapts to varying wind speeds, ensuring consistent power generation. Their project, Tempest Tech Turbine, aligns with the global Sustainable Development Goals (SDGs) and contributes to a cleaner, more resilient future.

> " Elevate Your Energy Independence With Tempest Tech Turbine's Innovative Wind Solutions. "

Solution

The Tempest Tech Turbine is an advanced wind turbine designed to function efficiently across different wind speeds. Unlike traditional turbines, it features an adaptive blade system that automatically adjusts to optimize power generation, whether in mild breezes or strong winds. This innovation ensures continuous electricity supply, mitigating the impact of power disruptions caused by extreme weather events.

The turbine consists of an automated blade adjustment mechanism, a high-efficiency generator and a weather-resistant structure. The adaptive blade system modifies its angle based on wind intensity, maximizing energy capture. The generator converts wind energy into electricity, while the robust frame ensures durability against harsh weather conditions.

As wind flows through the turbine, sensors adjust blade angles based on wind speed. Blades expand in low winds for maximum energy capture and retract in high winds to prevent damage while maintaining efficiency. The generated electricity is stored in a battery, ensuring a stable power supply despite wind fluctuations.

This project enhances electricity access in weather-prone regions, promoting community resilience and renewable energy adoption. It also provides students with hands-on STEM experience, fostering innovation in sustainable technology.

Conclusion

The Tempest Tech Turbine presents a practical and sustainable solution to power disruptions caused by extreme weather. By ensuring continuous energy production through an adaptive blade system, it enhances energy resilience and promotes sustainability. Future advancements could include integrating IoT-based wind monitoring, increasing turbine efficiency with AI-driven analytics and expanding its use for off-grid communities. Projects like this inspire future innovations in renewable energy, paving the way for a more sustainable and self-reliant world.

Hydrophilic Mattresses

How Can We Address Food Production Challenges in Regions Affected by Droughts and Floods to Ensure a Stable Food Supply for Vulnerable Communities?

School Name:
Indraprastha High School, Uppinangady, Dakshina Kannada

Agriculture in drought-affected regions suffers from water scarcity, leading to low crop yields and farmer distress. Conversely, flood-prone areas experience excess water accumulation, causing soil erosion and crop damage. There is an urgent need for an innovative irrigation system that optimizes water retention and prevents wastage in both extreme conditions.

Students from Indraprastha High School, Uppinangady of Dakshina Kannada district attended the Shell NXplorers workshop and focused on the problem of water accumulation in flood-prone areas, which causes damage to crops.

After going through the NXplorers Methodology they understood the need for managing the excess water during floods and worked on the innovative idea named Hydrophillic Mattress.

> " Harnessing Water, Empowering Harvests—The Future of Resilient Farming! "

Solution

The Hydrophilic Mattress is an eco-friendly water management system that combines sclerenchymatous coir and biopolymer pectin to absorb, store and release water efficiently. In drought-affected regions, it retains moisture in the soil, ensuring optimal hydration for crops. In flood-prone areas, it absorbs excess water, reducing waterlogging and soil erosion while storing it for future agricultural use.

This innovation supports Sustainable Development Goals (SDG) 2 (Zero Hunger), SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action) by promoting sustainable irrigation practices, improving food security and enhancing climate resilience. The Hydrophilic Mattress is a cost-effective, eco-friendly and scalable solution that empowers farmers to cultivate efficiently, regardless of extreme weather conditions.

With its ability to retain and regulate water supply, this revolutionary technology ensures better crop yields, reduced water wastage and sustainable farming practices, paving the way for a greener and more resilient future in agriculture.

Conclusion

The Hydrophilic Mattress presents an innovative and sustainable solution to the dual challenges of drought and flooding in agriculture. By effectively absorbing, storing and releasing water, it ensures optimal moisture retention in dry regions while preventing waterlogging in flood-prone areas. This eco-friendly and cost-effective approach enhances food security, water conservation and climate resilience, empowering farmers to cultivate efficiently despite extreme weather conditions. Future advancements could focus on scaling up production, integrating smart irrigation sensors and enhancing material durability for widespread implementation. With its potential to revolutionize sustainable farming, the Hydrophilic Mattress offers hope for a greener and more resilient agricultural future.

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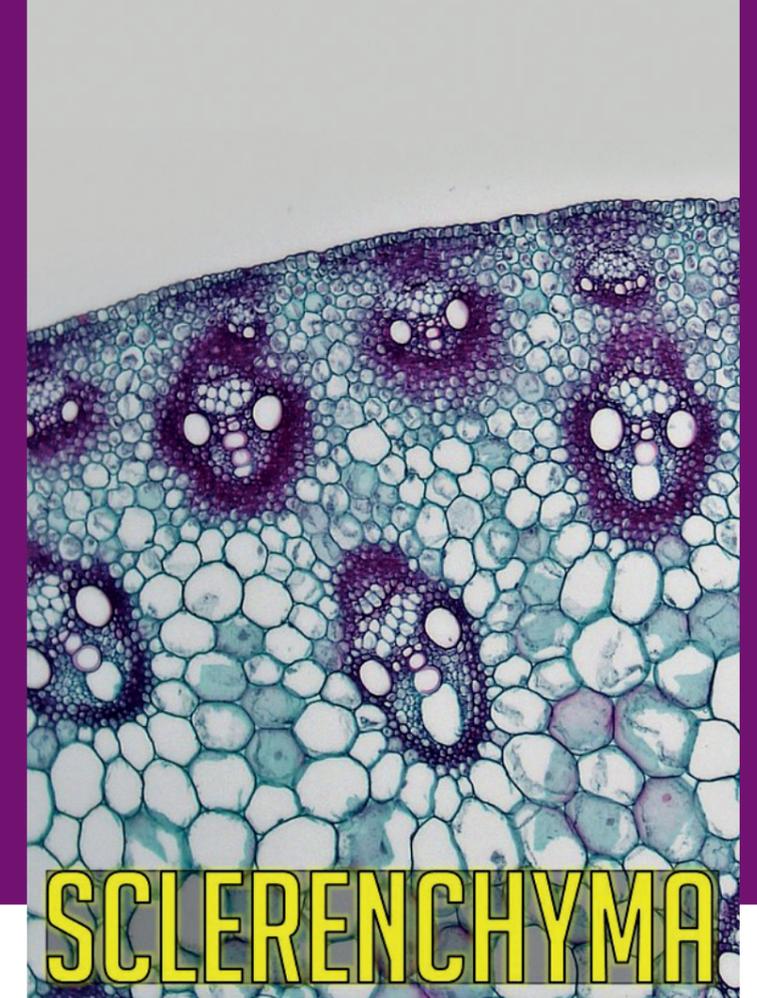
Micro – Hydro Generation

How Can We Enhance Agricultural Development in Rural Areas While Addressing Energy Needs?

School Name:
Swathanthra Hr Sec School, Vaiyampalayam, Coimbatore

In the farmlands of Coimbatore, electricity is more than just a utility—it's a lifeline. Yet, during the energy crises of 2008 and 2012, rural areas endured power cuts lasting up to 16 hours a day. While urban industries consumed the lion's share of electricity, farmers struggled to irrigate their fields. Many were forced to abandon agriculture, turning to daily-wage labor to survive.

Reliable electricity is essential for agricultural irrigation, but rising costs and chronic shortages are making it increasingly inaccessible to rural communities. Large hydroelectric projects, while effective, demand extensive infrastructure, costly dam construction and high-maintenance transmission grids. Additionally, traditional energy sources contribute to environmental degradation.

Recognizing the need for a decentralized, affordable and eco-friendly power source, students from Swathanthra Hr Sec School, Vaiyampalayam participated in the Shell NXplorers program. Applying the NXthinking methodology, the students designed an innovative Micro-Hydro Generation system that taps into the kinetic energy of local water bodies to produce clean electricity.

> " Micro Hydro Generation, Save The Future Generation "

Solution

Micro-Hydro Power Plant - A micro-hydro power generation unit that can be installed in small rivers, canals, or other water bodies with minimal infrastructure. Unlike large-scale hydroelectric dams, this setup requires only basic civil work near the water source. By utilizing the principle of whirlpool energy, the system enhances turbine efficiency, allowing continuous power generation at low water pressure.

The system consists of a small low-pressure turbine, a rotating generator and a basic support structure positioned within a flowing water body. The water current drives the turbine, converting mechanical energy into electrical energy. The generated power is stored in batteries or directly supplied to agricultural pumps, ensuring uninterrupted irrigation. As water flows through the micro-hydro unit, it creates a whirlpool effect, maximizing turbine efficiency. The turbine rotates continuously, generating electricity that can power irrigation systems or supply up to 60 rural homes. This self-sustaining model operates 24/7 without external energy inputs, making it an ideal renewable energy solution for rural communities.

The Micro-Hydro Generation system provides clean, reliable and affordable energy for farmers, reducing dependence on costly and unreliable grid power. It is easy to install and maintain, operates continuously and is environmentally friendly. Additionally, the system encourages sustainable water management and strengthens rural communities by ensuring energy independence.

Conclusion

Micro-hydro generation presents a viable solution to rural power shortages, ensuring sustainable energy for agricultural needs. Future enhancements could include automated energy storage, smart-grid integration and scalability to larger agricultural areas. If widely adopted, this technology can revolutionize farming in rural India, making it more resilient and sustainable.

Jackfruit as an Alternative Fuel

How Can We Address Food Waste While Exploring Sustainable Energy Solutions?

School Name:
Sri Ramakrishna High School, Puttur, Dakshina Kannada

With the global population expected to reach 9.7 billion by 2050, the twin challenges of food security and sustainable energy demand urgent attention. In India, the world's largest producer of jackfruit, a surprising irony unfolds—tons of this nutritious fruit go to waste each year. During the rainy season, unharvested jackfruit often rots in the fields, attracting pests, spreading disease and pushing farmers toward excessive pesticide use. The environmental and economic consequences are significant.

Seeing waste as a resource, students from Sri Ramakrishna High School took on this challenge through the NXplorers methodology, applying STEM-driven problem-solving to create a sustainable impact. Their innovative project focused on converting waste jackfruit into an alternative biofuel—an eco-friendly solution that addresses food waste, promotes renewable energy and supports farmers' livelihoods.
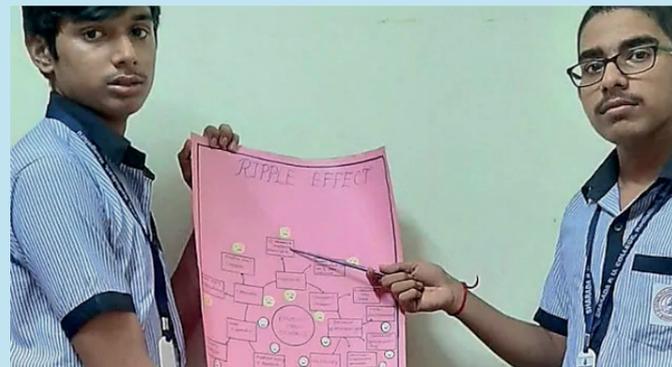
Scan the QR code and read the case study

" Turning Waste into Worth: Jackfruit Biofuel for a Greener Future! "

Solution

The students devised a method to convert waste jackfruit into bioethanol through fermentation and distillation. Ethanol, a renewable biofuel, can significantly reduce carbon emissions compared to traditional fossil fuels. By extracting bioethanol from waste jackfruit, the students not only found a way to utilize an underused resource but also provided farmers with an alternative source of income.

The process involves collecting discarded jackfruit, extracting its sugars and fermenting them using yeast. The resulting ethanol is distilled and purified to produce biofuel. This method ensures minimal environmental impact while offering a scalable, cost-effective fuel alternative.

Jackfruit waste is mashed to extract natural sugars, which are then fermented with yeast to produce ethanol. The mixture undergoes distillation to separate the ethanol, which is later refined and stored for use as biofuel. This systematic approach ensures efficient conversion of waste into a usable energy source.

This initiative reduces food waste while providing an eco-friendly fuel alternative. Farmers gain an additional revenue stream and the adoption of jackfruit-based bioethanol lowers carbon emissions, contributing to a sustainable energy transition.

Conclusion

By transforming waste jackfruit into a viable energy source, this project aligns with global sustainability efforts and the UN Sustainable Development Goals. Future advancements could include optimizing fermentation efficiency, integrating solar-powered distillation units and expanding bioethanol applications in rural energy systems. Scaling this initiative can revolutionize waste management and renewable energy solutions, making communities more resilient and self-sufficient.

Seed Sowing Shoes

How Can We Increase Agricultural Production Without Causing Long-Term Damage to Natural Ecosystems and Biodiversity?

School Name:
Vidyanand Bhavan High School, Nigdi Pradhikaran, Pune

In India's vast agricultural landscape, small-scale farmers—who form the backbone of our food system—continue to face persistent challenges. Despite their hard work, many are stuck using outdated tools and methods. Manual seed sowing, in particular, is laborious, inefficient and leads to uneven crop growth, reducing productivity. While modern machines exist, their high cost keeps them out of reach for most farmers.

This pressing issue sparked a powerful question in the minds of students from Vidyanand Bhavan High School: How can we sow the seeds of innovation without sowing the seeds of debt?

The idea began to take shape during a Shell NXplorers workshop facilitated by the Learning Links Foundation, where students explored solutions using the NXplorers methodology. Inspired by the struggles of local farmers, the students designed a simple yet impactful innovation: Seed Sowing Shoes.

> " The World's Food Production Lies at the Farmer's Feet, So Let's Ensure They Wear the Right Shoe. "

Scan the QR code and watch the video

Solution

Seed Sowing Shoes—an ingenious, low-cost prototype designed to mechanize seed sowing using nothing more than human movement. The device integrates a seed dispensing system into a pair of modified shoes, allowing users to plant seeds systematically with each step.

Integrated with IR sensors, an Arduino microcontroller and servo motors, the system detects the user's forward motion and releases seeds at consistent intervals as they walk across the field. A lightweight seed container and compact solar panel ensure the device remains portable, energy-efficient and easy to use without reliance on external power sources.

This smart solution ensures uniform seed spacing, leading to improved crop yields and better resource utilization. By reducing physical strain—especially for elderly farmers—and minimizing labor costs and time spent in the field, the Seed Sowing Shoes offer a sustainable and scalable innovation. Its affordability and simplicity make it highly suitable for widespread rural adoption, promoting both environmental responsibility and agricultural efficiency.

Conclusion

The Seed Sowing Shoes prototype is not just a tool—it's a vision for democratizing agricultural innovation. Looking ahead, advanced versions of this concept could include automated seed counting sensors, GPS-based spacing calibration, biodegradable seed cartridges and even IoT integration for tracking planting patterns and soil health. By blending tradition with technology, this project showcases how youth-led innovation can create tangible, scalable impact.

Infestation Repellent

How Can We Address The Challenges Posed By Infestation to Ensure Sufficient Crop Yield and Meet Food Demand?

School Name:
Kendriya Vidyalaya, Anna Nagar, Chennai

Food wastage is prevalent in many societies for various reasons. When looking at the bigger picture, it was stated by the food and Agriculture Organisation that in low-income countries food is mainly lost during the early and middle stages of the food supply chain; Most food loss occurs due to improper storage compared to the food wasted at the consumer level.

With the UN projecting a global population of 9.7 billion by 2050, the pressure on food systems will only intensify. While the world already produces more food than needed, nearly one-third—valued at over a trillion dollars—is lost or wasted. Tackling preventable losses like pest-driven spoilage is critical to ensuring food security, conserving resources and reducing economic setbacks.

In response to this challenge, students from Kendriya Vidyalaya, Anna Nagar, stepped up under the Shell NXplorers program and conceptualized the Infestation Repellent project. Leveraging the technology provided by the Atal Tinkering Lab, the students focused on preventing food loss in storage facilities through an innovative, technology-driven solution.
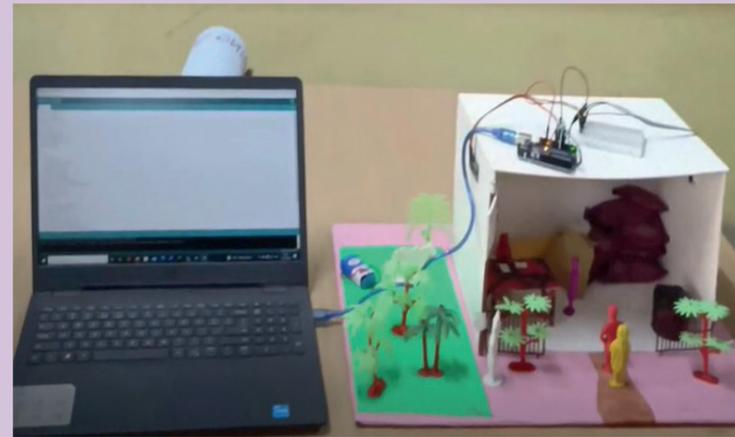
" Protecting Food, Preserving Futures — Ultrasonic Defense Against Infestation! "

Solution

The Infestation Repellent is a cost-effective, ultrasonic system designed to protect food storage areas by deterring pests without chemicals. It operates at 20 kHz ultrasonic frequencies, which are harmless to humans but disrupt pests' nervous systems, interfering with their navigation and forcing them to leave.

An ultrasonic sensor detects insect activity, triggering the Arduino Uno-controlled repellent. If pest levels increase, a buzzer system emits high-frequency sounds for additional deterrence. The lead-acid battery ensures continuous operation, making the system highly reliable with minimal maintenance. A driver circuit seamlessly integrates all components, enhancing efficiency.

By preventing infestation and food spoilage, this sustainable solution reduces food wastage, enhances food security and eliminates reliance on chemical pesticides. Its low-cost, eco-friendly design makes it an ideal choice for large-scale food storage facilities, ensuring long-term protection and improved storage efficiency.

Conclusion

The Infestation Repellent provides an efficient, scalable and sustainable solution to food storage challenges. By leveraging ultrasonic technology, it prevents food loss without the use of harmful chemicals. Future advancements could include AI-driven pest detection, IoT-based real-time monitoring systems and solar-powered modules for enhanced energy efficiency. Integrating these features would further revolutionize food storage management, ensuring global food security and sustainability.
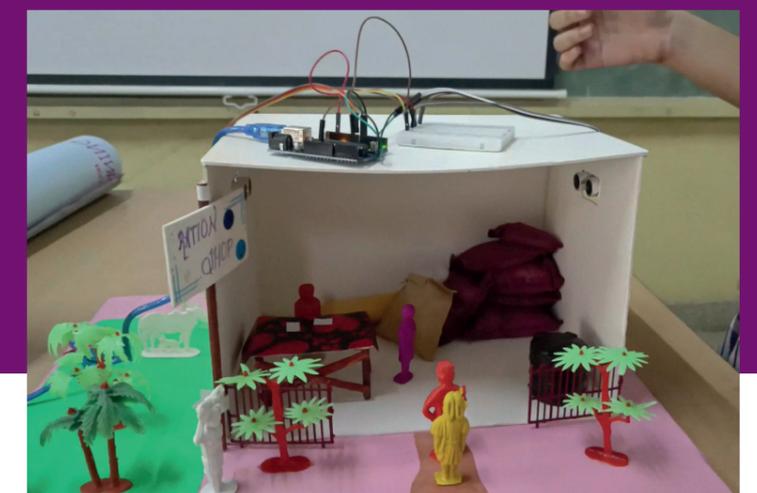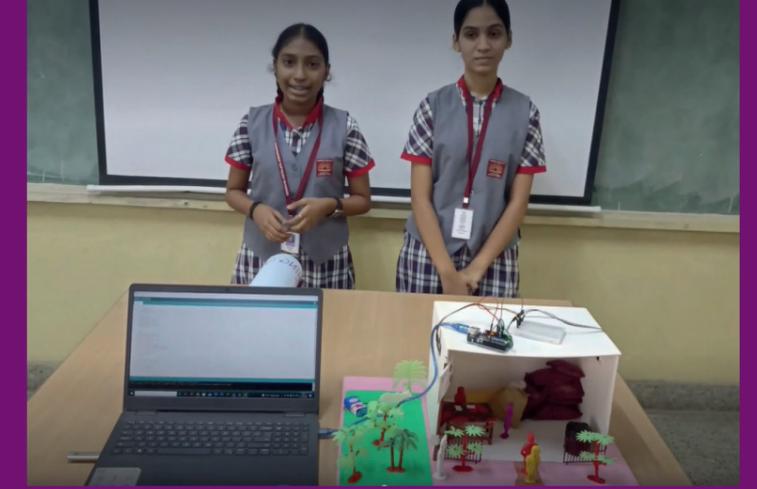
Wheat Husk

How Can We Meet The Demand of Biodegradable Packing Material Without Polluting The Environment?

School Name:
Tapovan School, Jigani, Bangalore

Plastic pollution remains one of the greatest environmental challenges of our time. Non-biodegradable plastics not only clog landfills and water bodies but also release toxic chemicals like dioxins and PAHs when burned—contributing to global warming and posing serious health risks. Stationery and packaging products, often made from single-use plastic or wood-based materials, add to this crisis.

Motivated by the NXplorers workshop, students from Tapovan School set out to address plastic dependency by exploring biodegradable alternatives. Through tools such as the Connection Circle, Feasibility Funnel and Ripple Effect, they analyzed the environmental, health and economic dimensions of plastic waste—leading them to a surprising yet sustainable solution: wheat husk, an agricultural byproduct.

Scan the QR code and watch the video

" Reimagine Waste, Redefine Sustainability. "

Solution

What started as a search for alternatives to plastic and wood-based products led the students to an innovative use of agricultural byproducts. They created a biodegradable composite using wheat husk and gum arabic, forming 100% compostable items like hardboards, coffee coasters and writing pads. With the addition of neem powder, the products gained natural fungal resistance—making them safe, durable and long-lasting.

During development, the students tested various binders. Gum arabic proved the most effective, while corn starch was too brittle and epoxy was rejected for being non-compostable. A parallel experiment with areca husk and gum arabic also showed promise in creating biodegradable plant pots, expanding the project's scope.

Designed with sustainability in mind, these products are not only plastic-free but also support a zero-waste circular economy—once used, they can be composted into agricultural manure or even used as cattle feed, ensuring nothing goes to waste.

Conclusion

The Wheat Husk Initiative is a compelling example of how simple, natural materials can offer powerful solutions to some of our biggest environmental problems. By replacing plastic and wood-based products with biodegradable alternatives, the students have demonstrated that innovation doesn't always require complex technology—sometimes it just takes a shift in perspective.

Their wheat husk products not only reduce plastic dependency but also minimize deforestation and food waste. The fact that these items can return to the soil as compost or even serve as cattle feed makes this a truly zero-waste solution. With continued experimentation and awareness, this initiative holds great promise for scaling sustainable alternatives and promoting responsible production in everyday life.

River Garbage Extraction Boat

How Can We Keep Rivers Clean by Preventing Improper Waste Disposal to Protect Ecosystems and Human Health?

School Name:
Shree Narayana Guru English Medium School, Malpe, Udupi

Rivers, once lifelines of civilizations, are now burdened with the weight of human neglect. From plastic wrappers to floating debris, suspended garbage has turned many of our water bodies into polluted streams—threatening aquatic life, degrading water quality and posing serious risks to human health.

Students from the Shree Narayana Guru English Medium School, Malpe, Udupi participated in the NXplorers workshop conducted by Learning Links Foundation, where they were encouraged to explore real-world societal challenges. Through the workshop, they came to understand that river pollution is not just an environmental issue, but a deeply interconnected problem impacting ecosystems, communities and long-term sustainability. This deeper awareness inspired them to explore meaningful ways to address the crisis.

They examined traditional river-cleaning methods, which are often manual, inefficient and limited in scope. Recognizing the need for a smarter, continuous system with minimal human intervention, they developed the River Garbage Extraction Boat—an automated solution to tackle water pollution more effectively.

" Sailing Towards Clean Waters—Automating River Cleanup for a Greener Future! "

Solution

The River Garbage Extraction Boat uses a treadmill-style conveyor mechanism powered by a rechargeable battery to collect floating waste from the water's surface. As the boat moves, the conveyor lifts debris and deposits it into an onboard bin—ensuring consistent cleanup with minimal oversight.

Operated via Radio Frequency (RF) transmitter and receiver, it can be easily directed toward high-pollution zones, making the cleaning process more targeted and efficient. Its compact structure enables it to navigate narrow and shallow areas, allowing frequent clean-up runs and thus reducing reliance on manual labor.

By combining automation with practicality, the project offers a scalable approach to restoring the health of our rivers.

Conclusion

The River Garbage Extraction Boat is more than just a machine—it's a step toward reclaiming our rivers. By automating the cleaning process, it protects marine ecosystems, reduces human effort and promotes healthier, more vibrant waterways.

As innovation sails alongside environmental responsibility, this student-led project proves that with the right tools and determination, we can restore the natural balance—one river at a time.

Passive Energy EV

How Can We Optimize The Energy Usage of Vehicles to Improve Energy Efficiency?

School Name:
P.A.C.M Higher Secondary School, Rajapalayam, Virudhunagar

As the world accelerates towards cleaner mobility solutions, electric vehicles (EVs) stand out as a beacon of hope in the fight against climate change. But even EVs face their own challenges—chief among them is the growing demand for energy and the need to optimize battery performance without relying solely on external charging infrastructure.

This pressing challenge sparked the imagination of a group of students from P. A. Chinniah Raja Memorial Higher Secondary School. Supported by the resources and tools available at their Atal Tinkering Lab (ATL),

they began exploring possibilities beyond conventional energy systems.

What if a vehicle could generate its own electricity just by moving? Could energy lost during motion be recaptured to improve performance?

Motivated by these questions, the students delved into the potential of piezoelectric technology, eventually developing a breakthrough concept to harness passive energy from vehicle movement—pushing the boundaries of how we think about energy efficiency in future mobility.

Scan the QR code and watch the video

> " Power on the Move:
> Harnessing Every Turn for a
> Greener Tomorrow "

Solution

The result of their exploration was the Passive Energy EV Vehicle—a prototype designed to capture and convert mechanical energy from wheel movement into usable electricity.

At the heart of this system lies a circular piston embedded within the vehicle's wheels. Constructed from durable materials and fitted with piezoelectric components, the piston is activated by the constant rotation and pressure from road contact. Each time the wheel turns, mechanical stress is applied to the piezoelectric elements inside the piston.

Through the piezoelectric effect, this stress is transformed into electrical energy. The system then collects this energy and channels it to the vehicle's power management unit—providing power for secondary systems or helping to recharge the main battery.

This process enhances energy efficiency and gives the vehicle the ability to support itself, reducing dependency on external charging and maximizing sustainability on the go.

Conclusion

One creative way to generate passive energy in an electric vehicle is to incorporate a circular piston with piezoelectric materials within the wheels. This device provides a novel way to improve the energy economy of the vehicle by transforming the mechanical forces experienced during operation into useful electrical energy. By extending the vehicle's operating range and serving as a backup power source, the suggested prototype could improve the overall sustainability of electric transportation. This technique could be widely used in next electric vehicles with more development and testing, which would advance the field of renewable energy solutions in automotive engineering.

Lumine Trap

How Can We Increase Crop Yield Without Resorting to Chemical Pesticides?

School Name:
J. M. Chaudhari Sarvajanik Vidyalaya, Pilaji Ganj, Mehsana

Gujarat's agriculture has long depended on chemical pesticides for pest control. However, the overuse of these chemicals has triggered a cascade of negative consequences: soil and water contamination, long-term health hazards for farmers, reduced biodiversity, pesticide resistance among pests and compromised food safety. Traditional pest management methods, while initially effective, have proven unsustainable and environmentally damaging in the long run.

During a NXplorers workshop, a group of bright minds from J. M. Chaudhari Sarvajanik Vidyalaya set out to find an eco-friendly solution to help farmers manage pests effectively without harming the environment. Their goal was to develop a method that was accessible, energy-efficient and aligned with sustainable agricultural practices. With guidance from the NXplorers facilitator from the Learning Links Foundation, the students conceptualized an innovative idea—the Lumine Trap.

> " Illuminating the Fields, Eliminating the Pests "

Solution

Lumine Trap—a solar-powered, UV light-based device that offers a chemical-free alternative to traditional pesticides. Leveraging the principle of phototaxis, the trap attracts and captures harmful nocturnal insects using a UV/LED light source. Once drawn in, pests are contained either through adhesive sheets or a low-energy electric grid, all housed within a protective trap unit. A solar panel powers the system, making it ideal for off-grid rural farms.

The Lumine Trap not only reduces the use of harmful chemicals but also promotes ecological balance and supports Integrated Pest Management (IPM). It helps improve crop yields, protects farmer health by minimizing chemical exposure and offers a cost-effective, environmentally-friendly solution. Successfully piloted on a local farm in Gujarat, the device has already demonstrated its real-world potential in advancing sustainable agriculture.

Conclusion

The Lumine Trap is more than just a pest control device—it's a step toward safer food, healthier farmers and cleaner farms. By replacing harmful chemicals with light-based trapping, it empowers farmers and protects the environment for future generations. With Lumine Trap, the solution is as simple as flipping on a light—one that guides agriculture toward a brighter future.

Scan the QR code and watch the video
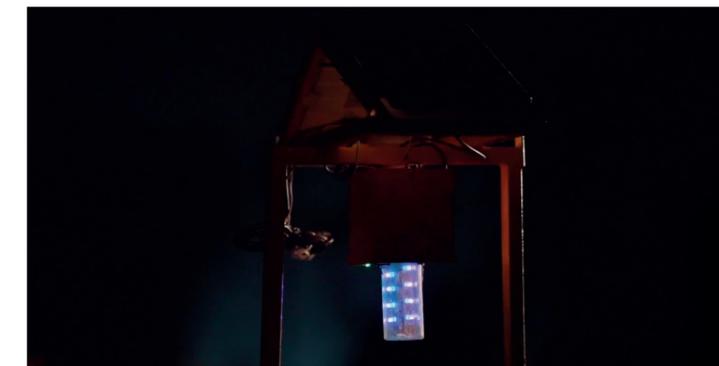
Agro Cycle

How Can We Increase Food Production in a Cost-Efficient Manner to Support Farmers and Improve Food Accessibility?

School Name:
Nutan Marathi Vidyalaya, Nerul, Navi Mumbai

Agriculture is the backbone of India, with 58% of the population relying on farming for their livelihood. However, traditional farming methods require extensive manual labor, consuming 6-7 hours per day for tasks such as ploughing, sowing and pesticide spraying. The high cost of mechanized equipment, ranging from Rs. 5 lakh to Rs. 10 lakh, makes modern farming tools inaccessible to small-scale farmers. Additionally, rising fuel prices further increase operational expenses, leaving farmers dependent on manual labor, which is both time-consuming and physically exhausting. A cost-effective and labor-efficient solution is necessary to improve agricultural productivity while reducing strain on farmers.

Many small-scale farmers in India cannot afford tractors and mechanized equipment, making them reliant on traditional farming practices. This dependency results in lower efficiency, reduced crop yields and financial instability. The lack of accessible and affordable farming tools has led to increased labor requirements, decreased productivity and excessive time spent on manual agricultural activities. To address these issues, a low-cost, multi-functional farming solution is needed to enhance efficiency, reduce labor dependence and promote sustainable farming.

Students from Nutan Marathi Vidyalaya, Sector-19, Nerul, Navi Mumbai have participated in the Shell NXplorers program. They explored the challenges faced by small-scale farmers and applied NXthinking methodologies to develop AgroCycle, an innovative farming tool designed to reduce manual effort, improve productivity and provide an affordable alternative to expensive mechanized equipment.

"
Samasya Hai Badi, Samadhan Chahiye, Acchi Kheti Ke Liye Agro Cycle Chahiye
"

Solution

AgroCycle is a manual, low-cost tool for ploughing, sowing and spraying pesticides, offering an affordable alternative to tractors while reducing strain and saving time. Its lightweight frame, rubber tires and interchangeable attachments enable easy operation and mobility. The manual push system eliminates fuel dependency, making it cost-effective and eco-friendly.

With ploughing, seed-sowing and spraying functions, AgroCycle boosts productivity, reduces labor costs and supports sustainable farming, empowering small-scale farmers.

Conclusion

AgroCycle represents a game-changing innovation for small-scale farmers, offering a cost-effective and labor-saving solution to enhance agricultural efficiency. Future improvements, such as iron tires for durability, motorized enhancements for better efficiency and advanced attachments for additional farming functions, can further revolutionize traditional farming practices. By modernizing agriculture in an affordable and sustainable way, AgroCycle paves the path toward a more resilient and productive farming future.

Scan the QR code and watch the video

Bio Mimicry

How Can We Improve Water Collection Efficiency While Ensuring Sustainability?

School Name:
K.M. Jariwala English Medium Girl's High School, Shahpore, Surat

Many regions in Gujarat, particularly in central and northern areas like Kutch, face severe water scarcity, receiving only 30-40 cm of rainfall annually. Farmers in these areas rely heavily on rainwater for irrigation, which negatively impacts crop production. Traditional irrigation methods are either ineffective or require significant infrastructure and energy resources. There is a critical need for an innovative, sustainable and self-sufficient solution to provide water for agriculture without dependence on electricity or complex technologies.

Agriculture in water-scarce regions is a constant challenge. Farmers in North Gujarat struggle to sustain crops due to limited access to water and conventional greenhouse farming has proven ineffective. Climate change and erratic rainfall patterns further exacerbate the issue, making it essential to explore alternative irrigation methods. Drawing inspiration from nature, a bio-mimetic approach can offer an innovative solution to harvest water vapor from the atmosphere and channel it directly into the soil for irrigation.

Young innovative Students from K.M. Jariwala English Medium Girl's High School, Surat, Gujarat have participated in the Shell NXplorers program, where they identified irrigation challenges in their region. Using the NXthinking methodology, they developed a nature-inspired water collection model that mimics the water-harvesting abilities of organisms like the Namibian beetle, the cactus plant and the insectivorous pitcher plant to create an efficient, low-cost irrigation system.

" Harvesting Nature's Wisdom—Sustainable Irrigation from Air! "

Solution

The students designed a water collection system that extracts moisture from the air and channels it into the soil using bio-inspired principles. The Namibian beetle's hydrophilic-hydrophobic back helps condense water vapor, while the spiny structure of the cactus guides water droplets towards a central point. The waxy surface of the pitcher plant further reduces friction, allowing the collected water to flow smoothly into the soil, ensuring effective irrigation.

The model mimics the Namibian beetle's surface for condensation, with cactus-like spines guiding water to the center. A waxy coating ensures smooth flow into the soil, efficiently converting water vapor into irrigation water.

Water vapor in the air condenses on the specialized surface, forming droplets. These droplets are then channeled through a spiny cactus-like structure that directs them towards a storage area or directly into the soil. The waxy coating from the pitcher plant design reduces resistance, ensuring smooth water flow. This self-sustaining system functions without external energy input, making it ideal for drought-prone areas.

This sustainable, electricity-free irrigation system benefits dry regions by providing a consistent water source, reducing reliance on erratic rainfall. Eco-friendly and scalable, it enhances agricultural output while ensuring food and water security.

Conclusion

This bio-inspired water harvesting model presents a revolutionary approach to sustainable irrigation in water-scarce regions. Future improvements could focus on enhancing condensation efficiency, expanding the coverage area and integrating storage solutions for excess water collection. If implemented at scale, this system can transform farming practices in arid regions, improving crop yields and promoting resilience against water shortages.

Eco Air Defender

How Can We Address Outdoor Air Pollution in Urban Areas to Protect Public Health and Environmental Sustainability?

School Name:
Salwan Boys Senior Secondary School, Old Rajinder Nagar, New Delhi

Air pollution in urban areas, especially in cities like Delhi, poses a grave threat to public health, environmental sustainability and the availability of clean food and water. Increasing levels of pollutants such as PM2.5, PM10 and toxic gases are contributing to respiratory illnesses, reduced life expectancy and ecological degradation.

Recognizing this urgent crisis, students of Salwan Boys Senior Secondary School, guided by the NXplorers methodology, explored innovative and sustainable solutions to address air pollution. Applying systems thinking, scenario planning and strategic innovation, they tackled the issue from multiple angles. Leveraging the tools and resources available in the Atal Tinkering Lab, the students transformed their ideas into a practical prototype—Eco Air Defender. This sustainable, technology-driven solution showcases the power of youth-led innovation in combating outdoor air pollution and promoting long-term environmental health.

> " Healthy Skies, No More Lies, Eco Air Defender, Watch Us Rise! "

Solution

The Eco Air Defender is a renewable energy-powered indoor air purification system developed to combat air pollution within enclosed spaces such as classrooms, staff rooms, libraries, and healthcare waiting areas. Powered by solar panels and a vertical-axis wind turbine, the device is designed to function off-grid, making it both sustainable and energy-efficient. Its primary components include a two-stage air filtration system comprising a HEPA filter to trap fine particulate matter such as PM2.5 and PM10, and an activated carbon filter to absorb toxic gases, odors, and volatile organic compounds commonly found in indoor environments.

The purifier features a durable DC fan that draws in surrounding air from the room. As the air passes through the layered filters, pollutants are effectively removed, significantly improving the indoor air quality. Unlike conventional purifiers, the Eco Air Defender does not require a directed outlet. Instead, it operates passively and continuously from a fixed position in the room, maintaining cleaner air levels throughout the space. This makes it ideal for corner placement, ensuring minimal disruption to daily activities while providing consistent air purification.

In addition to its filtration capabilities, the system is equipped with real-time air quality monitoring sensors. These sensors display pollution levels through an attached digital panel, enabling users to stay informed and responsive to changes in indoor air conditions. Its compact and modular design allows for easy installation and repositioning, depending on the room layout and ventilation patterns. By integrating clean energy usage with accessible technology, the Eco Air Defender serves as a replicable model of how student-led innovation can address real-world health challenges within indoor environments in a sustainable and impactful manner.

Conclusion

The Eco Air Defender is more than an air purifier—it's a symbol of innovation, responsibility and hope for a healthier future. By addressing air pollution at the community level, it:

Promotes Public Health – reducing exposure to harmful airborne pollutants.

Supports Sustainable Cities – by providing a scalable and renewable-powered solution.

Drives Climate Action – through clean energy usage and environmental awareness.

Bio Magnification in Colocasia Plant

How Can We Address Water Pollution to Support Staple Food Production?

School Name:
Vivekananda English Medium School, Puttur, Dakshina Kannada

Across many Indian cities, water bodies are under siege—polluted by unchecked household, industrial and agricultural waste. In Karnataka, where the semi-aquatic plant Colocasia esculenta (commonly consumed for its nutritional and medicinal value) forms a key part of local diets, this pollution poses a hidden danger. Toxic heavy metals like cadmium infiltrate the water and, in turn, accumulate in the plants—posing serious risks to food safety and public health.

Prolonged exposure to cadmium and other metals can cause severe health issues, including organ damage and developmental disorders. Addressing this issue requires an innovative, nature-based approach to purifying water and ensuring food safety.

Students from Vivekananda English Medium School, Puttur, Mangalore, Karnataka attended the Shell NXplorers workshop, where they explored sustainable solutions for their community's water contamination issues. Inspired by the Food-Water-Energy Nexus, they conducted extensive research and discovered that Eichhornia crassipes (water hyacinth) has the ability to absorb heavy metals from water. They developed a Nature-Based Solution by integrating this plant into agricultural landscapes to minimize metal contamination and ensure safer food production.

" Purifying Water, Protecting Lives—A Natural Solution for a Safer Future! "

Solution

Phytoremediation Using Eichhornia crassipes: The students proposed growing Eichhornia crassipes (commonly known as water hyacinth) along the boundaries of farms to act as a natural bio-filter. The plant absorbs heavy metals from the soil and water, preventing toxic substances from seeping into edible crops like Colocasia esculenta. This approach reduces the health risks associated with metal accumulation in food while restoring the quality of water sources.

The model involves strategic planting of Eichhornia crassipes around contaminated water bodies and irrigation channels. These plants extract heavy metals from the water, purifying it before it reaches agricultural fields. The process is cost-effective, self-sustaining and eco-friendly, requiring minimal intervention while significantly improving water quality over time. As water flows through areas where Eichhornia crassipes is planted, the roots absorb heavy metals like cadmium. Over time, the plant accumulates these toxins, effectively filtering the water. Regular harvesting of the plants prevents re-release of metals into the ecosystem. This low-maintenance solution naturally detoxifies water, ensuring safer irrigation for crops.

The project helps create a cleaner water supply for agriculture, ensuring that Colocasia esculenta and other food crops remain free from harmful metal contamination. By implementing this solution, the community benefits from improved public health, safer food sources and a reduction in environmental pollution. Additionally, the method encourages sustainable agricultural practices while raising awareness about water conservation.

Conclusion

The Nature-Based Solution provides a simple, effective and scalable approach to combating heavy metal pollution in water sources. Future improvements could include expanding the use of phytoremediation to larger contaminated areas, integrating additional bio-filtration plants and developing low-cost water testing kits for farmers. If adopted on a larger scale, this solution can significantly improve water security, agricultural sustainability and community well-being.

Agri Spray

How Can We Improve Pesticide Spraying Practices in Indian Agriculture to Protect Human Health, Safeguard The Environment and Support Sustainable Crop Production?

School Name:
Vivekananda English Medium School, Puttur, Dakshina Kannada

In the agricultural heartland of Dakshina Kannada, Karnataka, farmers risk their health daily while spraying agrochemicals like Bordeaux mixture on betel nut crops. The traditional tools they rely on—manual Gator pumps—are inefficient, fuel-dependent and expose farmers to harmful chemicals. Prolonged use leads to skin and eye infections, while uncontrolled spraying results in wastage, high costs and environmental harm.

Recognizing this pressing issue, the students of Vivekananda English Medium School participated in the Shell NXplorers program, where they analyzed challenges in agricultural spraying and developed an innovative solution with the help of the Atal Tinkering Lab in their school. With guidance from NXplorers mentors and school teachers, the students leveraged STEM methodologies to design an automatic, battery-powered Agri Sprayer, prioritizing health, efficiency and sustainability.

Scan the QR code and read the case study

> " Less Harm, More Charm – Smart Farming on the Farm "

Solution

The Agri Sprayer is a solution that automates the pesticide application process using a battery-powered mechanism. The sprayer effectively regulates pressure and pesticide output, reducing wastage and preventing excessive exposure to harmful chemicals. It is cost-effective, easy to operate and enhances overall farm productivity while protecting farmers' health.

The Agri Sprayer consists of a rechargeable battery, a pressure-regulated pump and an automated nozzle system. The battery eliminates the need for manual pumping, reducing labor efforts. The pump controls the pressure to ensure uniform pesticide distribution and the nozzle system allows precise spraying, reducing chemical overuse and environmental impact.

The sprayer operates with a battery-powered pump that pressurizes the pesticide mixture before releasing it through automated nozzles. The controlled pressure ensures even distribution, minimizing exposure risks and optimizing chemical usage. Farmers can operate the sprayer with ease, significantly cutting down spraying time and improving efficiency.

The Agri Sprayer improves agricultural efficiency, reduces chemical exposure risks and lowers operational costs. Farmers benefit from enhanced safety, reduced labor and better pesticide management. Additionally, its battery-powered operation leads to lower fuel consumption and noise pollution, promoting sustainable farming practices.

Conclusion

The Agri Sprayer is an innovation that has the potential to revolutionize agricultural spraying, making it safer and more efficient. Future advancements could include integrating solar-powered charging, AI-based precision spraying for targeted pest control and IoT-enabled monitoring systems for real-time data analysis. Scaling this solution across different agricultural sectors could significantly enhance sustainability and farmer well-being.

Eco Leather

How Can We Manage Water Inefficiency in Industrial Processes to Conserve Resources and Minimise Environmental Impact?

School Name:
Shiravane Vidyalaya, Nerul, Navi Mumbai

Behind the glossy finish of leather lies a darker truth—industrial tanneries are among the leading contributors to water pollution. The leather production process demands excessive water and harsh chemicals like chromium and sulfides, which often end up contaminating nearby water sources. As the global leather industry grows, so do its environmental consequences. Tanneries generate large volumes of wastewater, which, if improperly treated, leads to severe contamination of water sources. Additionally, traditional leather alternatives like synthetic leather are made from fossil fuels and take centuries to decompose, further exacerbating pollution. A sustainable, biodegradable and cruelty-free alternative to animal leather is necessary to minimize ecological impact.

Students from Shiravane Vidyalaya, Nerul, attended the Shell NXplorers workshop, where they identified the environmental hazards posed by the tannery industry. The students applied NXthinking methodologies to analyze the problem and develop an innovative solution—Eco-Leather—a plant-based alternative to conventional leather that significantly reduces water pollution and industrial waste.

Winner of the 2nd prize at IIT Techfest Mumbai 2024, Eco Leather pioneers sustainable material solutions for a greener future.

" Come, Let's Join Hands Together to Promote Eco-Leather! "

Scan the QR code and read the case study

Solution

Eco-Leather is an organic, biodegradable material made from agricultural waste and plant fibers. By using coconut water, coconut fibers, pineapple juice and fibers, plant resins and other agricultural byproducts, this innovative leather alternative offers a sustainable and non-toxic substitute for traditional leather while addressing environmental concerns.

The process begins by inoculating coconut water with Acetobacter xylinum to produce bacterial cellulose. This cellulose is cultivated through controlled fermentation using pineapple juice and sugar. Once the cellulose jelly forms, it is blended with coconut and pineapple fibres along with natural resins to enhance strength and flexibility. The mixture is poured into trays, pressed to remove excess water and sun-dried under pressure to form leather-like sheets of Eco Leather. Natural dyes may be added for colour customisation.

Eco-Leather provides an affordable and eco-friendly alternative to animal leather, reducing dependence on fossil fuel-based synthetic leather. It minimizes water pollution, lowers industrial chemical runoff and promotes sustainable agricultural waste utilization. Additionally, the project creates employment opportunities by enabling small-scale production and fostering environmentally responsible business models.

Conclusion

The development of Eco-Leather offers a revolutionary approach to sustainable fashion and industrial material production. Future advancements could include optimizing bacterial cellulose yield, improving durability for large-scale commercial use and integrating automation for efficient production. If widely adopted, Eco-Leather can transform the leather industry, reduce environmental damage and pave the way for a more sustainable and ethical economy.

Agri Electric

How can we manage organic waste in cities to reduce pollution and improve the well-being of people and the environment?

School Name:
Modern School and Junior College, Vashi, Navi Mumbai

India generates nearly 50 million tonnes of fruit and vegetable waste annually, much of which ends up in overflowing landfills. As this organic matter decomposes, it releases methane, which is 25 times more potent in driving climate change than carbon dioxide. At the same time, many communities continue to struggle with energy shortages and declining soil fertility. To address this, under the guidance of the Shell NXplorers program and the respective ATL coordinator, students at Modern School and Junior College, Vashi, Navi Mumbai, explored how organic waste could be reimagined as a resource rather than ending up as trash. Using NXthinking tools, they examined the interconnected problems of food waste, energy demand and soil degradation. Their analysis led them to develop Agri Electric, an idea that demonstrates how the organic waste can be harnessed to generate renewable power while also supporting sustainable farming.

" Eco-Friendly Energy Harvesting Nature's Power! "

Solution

Agri Electric is a low-cost and eco-friendly system that converts everyday bio-waste into electricity and compost. Fruit and vegetable scraps are placed in a microbial fuel cell where naturally occurring microbes decompose the waste and release electrons. These electrons pass through electrodes to generate a steady electrical current that can power LED lights or charge low-power devices. The by-product is organic compost that enriches soil fertility and reduces dependence on chemical fertilisers.

The Agri Electric is affordable and simple, making it suitable for households, schools, markets and farms across India. By diverting waste from landfills, reducing methane emissions and producing renewable energy, Agri Electric demonstrates a practical example of a circular economy. It turns a disposal challenge into a local resource, offering communities a sustainable way to manage waste. This approach not only addresses environmental concerns but also enables people to take meaningful climate-positive action in their daily lives.

Conclusion

Agri Electric transforms organic waste into a renewable resource by generating electricity through microbial processes and producing compost that enriches soil. The project reduces landfill pressure, lowers greenhouse gas emissions and provides communities with clean and affordable energy. Developed by students, it embodies the principles of sustainable living and a circular economy, where waste is transformed into a valuable resource. The model is simple, adaptable and low-cost, making it suitable for households, schools, markets and farms. Agri Electric shows how youth-led innovations can drive climate action and expand access to renewable energy across India.

BioHerb Fuel and Herbal Paper

How Can We Manage Agricultural Waste Without Increasing CO₂ Emissions?

School Name:
Karnataka Public School, Kaggalipura, Bengaluru

In India, nearly 500 million tonnes of crop residue are generated every year, and studies show that 60 to 65% of it is left unused or openly burned. This practice releases close to 90 million tonnes of smoke and pollutants annually, severely degrading air quality, reducing soil fertility, and accelerating climate change. At the same time, India's paper industry depends heavily on raw materials, with 74 to 76% coming from recycled fibre, 6 to 8% from agro-residues, and 18 to 20% from trees. While the cutting of trees for paper remains an issue, the larger challenge lies in the burning of crop residue, which wastes valuable biomass.

To address this, students at Karnataka Public School, Kaggalipura,

Bengaluru, applied the NXplorers methodology and designed a dual solution. They developed Bioherb Fuel, which produces biodiesel from grass through extraction and transesterification, offering a renewable and low-emission energy source. In parallel, they created Herbal Paper, an eco-friendly paper alternative made from grass pulp. Together, these innovations demonstrate how agricultural waste can be repurposed into sustainable energy and everyday products.

> " Grass to Green: Fueling Change, Shaping Futures "

Solution

Across India, grass grows abundantly in fields, meadows, and even unused patches of land, yet much of it goes to waste. Students reimagined this simple resource into two robust solutions that support both energy and sustainability.

For preparing the BioHerb Fuel, grass is collected and processed to extract oils using solvents. These oils undergo a chemical conversion called transesterification with methanol and sodium hydroxide, producing biodiesel that can be refined for everyday use. This fuel emits up to 60% fewer greenhouse gases than conventional diesel, offering a cleaner alternative for rural communities where invasive grasses can be turned into energy instead of being discarded. In parallel, Herbal Paper transforms grass into pulp through a process of soaking, boiling, grinding, and drying, resulting in sheets. This method consumes fewer chemicals and less water than wood-based paper, reduces deforestation, and gives us an eco-friendly alternative for schools, homes, and businesses.

Conclusion

BioHerb Fuel and Herbal Paper demonstrate how waste grass can be transformed into a sustainable solution that addresses multiple challenges in India. It reduces air pollution from burning, conserves trees and provides cleaner energy and eco-friendly products. The approach can also create local employment opportunities, support farmers and encourage the responsible use of natural resources. Making productive use of materials that are often discarded promotes sustainability, protects the environment and inspires communities to adopt climate-positive practices. This solution demonstrates that simple, low-cost innovations can have a lasting impact on the environment and contribute to a greener, healthier, and more resilient future.

Aquadline Turbine

How Can Communities in India Meet Growing Energy Needs in a Sustainable and Affordable Way While Managing Environmental Impact?

School Name:
Ramco Vidhayala, Vachakarapatti, Virudhunagar

India faces a growing energy challenge, with over 230 million people, primarily in rural areas, still lacking access to reliable electricity. Rapid population growth and increasing industrial demand are placing immense pressure on the national grid, while over 20% of electricity is lost due to inefficient transmission and distribution. Managing energy demand in underserved communities is therefore both critical and complex. Key issues include a heavy reliance on polluting fossil fuels, high costs and the resulting environmental degradation, which impact health, livelihoods and economic development.

This challenge became the focus for the students at Ramco Vidhayala during the NXplorers Juniors workshop, and they conceived Aquadline Turbines as a perfect solution to the persisting power demand. The solution deploys specialised wind-water hybrid turbines that efficiently harness local resources. By enabling consistent and affordable power generation, minimising transmission losses and reducing emissions, this idea empowers rural communities and offers a replicable model for sustainable development in India and beyond.

> " Powering Rural Futures with Twin Energy! "

Solution

In rural India, electricity shortages and frequent power cuts are common. Many households and farms rely on costly diesel generators, which increase expenses and contribute to pollution. The Aquadline Turbine is designed as a clean and affordable alternative that uses the natural power of water and wind to generate electricity locally.

The process begins by placing small turbines in canals, tanks, or reservoirs. Flowing water pushes the blades connected to a rotor, which is then converted into mechanical energy. Magnets and copper coils transform this into electricity. Alongside, wind blades capture air currents and drive an additional rotor. This hybrid design enables the production of power during both day and night, across various seasons.

The electricity is stored in batteries or connected to village mini-grids for reliable use. Energy storage and innovative microgrid systems ensure a steady supply for homes, schools, and small businesses. Local training and operation programs encourage community ownership while creating jobs and supporting rural growth.

Conclusion

Aquadline Turbines represents a transformative approach to decentralised renewable energy, tackling energy poverty and environmental sustainability. By integrating efficient wind-water hybrid technology with local engagement, the project ensures reliable, affordable and clean electricity in underserved communities. It empowers rural economies, reduces greenhouse gas emissions and encourages the adoption of renewable practices. In the future, additional turbine units could be networked into local microgrids, combined with solar integration, energy storage and linkage to monitoring platforms. These enhancements would strengthen energy resilience, expand access to clean power and create a scalable model that can be replicated across diverse regions of India.

Dehumidifier Bottle

How Can We Ensure Universal Access to Clean Drinking Water Without Putting Excessive Pressure on Existing Water Resources?

School Name:
Salwan Boys Senior Secondary School, Old Rajinder Nagar, Delhi

The global water crisis is one of the most significant challenges facing the world today. According to the United Nations, more than 2.2 billion people still lack access to safe drinking water. Climate change, rising population, and careless use of resources are putting more pressure on our already limited freshwater resources. In rural and small towns, the problem is even worse. Families often walk long distances to collect water that is unsafe to drink. This affects their health and takes away time from education, work and family life. Using the NXthinking tools of the NXplorers methodology, the students at Salwan Boys Senior Secondary School discussed how natural resources can be used wisely while causing less harm to the environment. To bring their idea to life, they used the materials available in the ATL Lab to make a working prototype called the Dehumidifier Bottle. This portable device collects clean water directly from the air, benefiting rural families, schoolchildren, and urban communities by providing them with safe and eco-friendly drinking water.

> " Clean Water, Anywhere; Empowering Communities Everywhere. "

Solution

The Dehumidifier Bottle is a compact solar-powered device designed to produce drinking water from humid air. It utilises a DC fan, Peltier module and heat sink to draw in air, cool it and condense it into droplets. These droplets are collected in a transparent bottle, making clean water available for immediate or later use.

The device runs on a solar panel mounted on a 3D-printed frame, allowing it to operate even in villages and areas with limited or no electricity. The collected water is stored in a chamber, making it convenient and easy for daily use.

With its lightweight design and use of renewable energy, the Dehumidifier Bottle provides regular access to safe drinking water in remote areas of India. It reduces the need to walk long distances, saves time and lowers dependence on single-use plastic bottles. It is an affordable and eco-friendly solution for rural families, schools and urban communities.

Conclusion

The Dehumidifier Bottle reflects the creativity and determination of young innovators committed to addressing one of the world's most significant challenges. By producing clean water from the air around us, this solution not only improves daily living conditions but also promotes environmental stewardship. With further refinement, the project has the potential to transform how vulnerable communities access safe drinking water while reducing plastic waste.
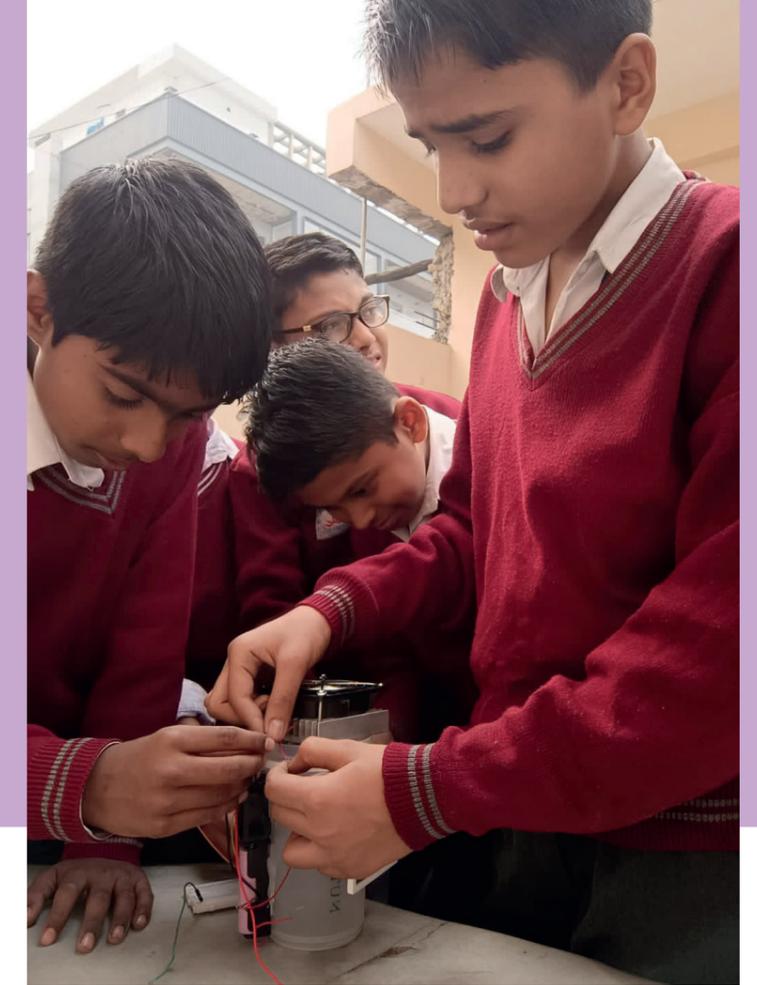
Magic Pot

How Can We Manage Use of Plastics in Plant Nursery Without Any Impact on The Environment?

School Name:
Nutan Marathi Vidyalaya, Nerul, Mumbai

India's rapid population growth and expanding urbanisation have placed immense pressure on food systems. To meet demand, many farms rely heavily on chemical fertilisers, pesticides and hybrid crops, which can harm human health and degrade the environment. In recent years, awareness of organic farming has grown, with more people embracing home gardening and sustainable agriculture.

However, even these efforts often come with plastic. Saplings purchased from nurseries are usually supplied in plastic bags. Once planted, the plastic is discarded, adding to India's growing waste problem. The country generates over 3 million tonnes of plastic waste annually, much of which ends up in landfills or rivers, worsening pollution and threatening the health of soil and water.

While participating in the NXplorers program, students of Nutan Marathi Vidyalaya recognised an opportunity to address both plastic pollution and food waste within a circular model. Their innovation: biodegradable planting pots made from everyday household organic waste, reducing plastic use and promoting sustainability.

> **From Scrap to Sap, Life Finds Its Map**

Solution

The Magic Pots offer a practical and sustainable solution to managing plastic waste in gardening and planting. They are made from everyday food waste materials such as peanut shells, eggshells, used tea powder and starch powder, which are usually discarded. These materials are transformed into strong, compostable planting pots that are rich in nutrients like nitrogen, phosphorus and potassium. As they decompose, the pots enrich the soil, improve fertility and support healthy plant growth while eliminating plastic waste.

The process is designed to be accessible and low-cost, allowing households, nurseries and farmers across India to produce their own pots at home. Each pot becomes part of a regenerative cycle, nurturing plants and returning essential nutrients to the soil. By turning waste into a valuable resource, the Magic Pots promote sustainable farming, reduce environmental pollution and empower communities to adopt eco-friendly practices. This approach demonstrates how simple innovations can address multiple social and ecological challenges simultaneously.

Conclusion

Magic Pot demonstrates how everyday organic waste can be transformed into biodegradable planting pots, reducing plastic use, enhancing soil fertility, and promoting sustainable gardening practices. The project supports households, nurseries and farmers while fostering awareness of circular economy principles. In the future, production could scale to community nurseries, school gardens and urban rooftop farms, while incorporating additional compostable materials and simple mechanised moulding techniques. Digital tracking of compostable outputs or integration with educational programmes could further engage youth. These enhancements would increase accessibility, reduce plastic waste more effectively and empower communities across India to adopt regenerative gardening and sustainable agriculture practices.

Spinergy

How Can We Help Communities in India Meet Growing Electricity Needs Without Increasing Pollution From Fossil Fuels?

School Name:
Angadi International School, Savgaon road, Belgaum

India's electricity demand is growing rapidly, with consumption rising around 9% annually since FY21, compared to an average of 5% in the previous decade. This surge is driven by urbanisation, economic growth and rising cooling needs during frequent heatwaves. While the country achieved 100% household electrification in 2021, power supply remains uneven. Over 75% of India's power generation still relies on coal, significantly contributing to greenhouse gas emissions and environmental degradation. These challenges make sustainable and decentralised solutions essential.

During the NXplorers workshop, students at Angadi International School used the Consequences Circle tool to analyse and identify Spinergy as a practical idea. Using materials available in their ATL Lab, they developed a working prototype of Spinergy, a swing-based hybrid system that stores electricity through a compact generator, gearbox and battery module.

" Swing and Spin, Let the Power Begin "

Solution

Spinergy converts playful activity into usable power through a simple mechanical-electrical system. A generator is linked to the swing's rotational shaft using a low-maintenance gearbox that increases RPM for efficient electricity generation. The alternating current is rectified and controlled through a charge unit before being stored in a sealed battery pack. Stored energy can be used for LED lighting or USB ports to charge small devices. Safety is prioritised through features such as speed regulators, protective enclosures and waterproof components, making the system secure for children. Modular design allows units to be repaired, upgraded or connected to form a small microgrid that powers community hubs. The working prototype developed by the students also includes training for local technicians and workshops for schools, promoting awareness of renewable energy. By offering low-cost decentralised generation, Spinergy reduces reliance on diesel or kerosene and supports clean, resilient power access to underserved areas.

Conclusion

Spinergy demonstrates how everyday play can generate clean, local energy, reducing reliance on fossil fuels and meeting basic power needs. Beyond providing lighting and device charging, it builds technical skills, promotes sustainable habits and encourages youth engagement. Partnering with schools, community groups and local technicians ensures ownership and long-term reliability. In the future, multiple swings could be linked into community microgrids, and solar panels or other energy-harvesting devices could be integrated. Simple digital monitoring could also track energy use. Such enhancements would expand Spinergy's impact, making local energy systems more resilient, low-carbon and inspiring continued innovation in renewable solutions across India.

Storanion

How Can We Minimise Spoilage and Waste of Perishable Food Items such as Onions in Households and Markets to Protect Income, Food Security and Resources?

School Name:
Vishwakarma Vidyalaya, Bibwewadi, Pune

India loses nearly 18% to 20% of perishable food annually due to inadequate storage and mishandling, causing significant economic losses and affecting food security. Onions, a staple in Indian kitchens, are highly susceptible to spoilage due to poor ventilation, temperature fluctuations, and a lack of real-time monitoring. Both households and vendors incur losses when storage conditions are inadequate, affecting income, sustainability and nutrition. After attending the Shell NXplorers program, students applied tools such as the connections circle, scenario planning quadrant, feasibility funnel and ripple effect diagram to map the causes, connections, and broader impacts of food spoilage. They identified that early detection of rot and maintenance of optimal storage conditions were critical to reducing wastage. By understanding the storage ecosystem, the team concluded that a technological intervention could protect produce, save resources and enhance trust among households, vendors and local communities. They named the project Storanion and the prototype was made using the materials and sensors available in their ATL Lab. This innovative idea promotes responsible consumption, sustainable practices and community awareness in urban and semi-urban Indian contexts.

Scan the QR code and
read the case study

> " Freshness Preserved, Waste Curbed,
> Planet Nurtured "

Solution

Storanion is a smart, ventilated storage box with three compartments, each equipped with sensors to detect early signs of spoilage. The system continuously monitors temperature, humidity, and food condition. When a compartment shows rot or deterioration, a servo mechanism and conveyor belt automatically remove the spoiled produce, protecting the remaining items.

A mobile application connected to the system provides real-time monitoring, enabling users to track freshness remotely, receive alerts and adjust storage conditions if necessary. The Arduino-based system integrates IoT sensors with automated response mechanisms for timely action. Students tested the prototype with teachers, peers, and local vendors, refining sensor calibration and automation logic to ensure accurate detection.

The design is modular, cost-effective and scalable for households, restaurants and marketplaces. Future enhancements include AI-based spoilage prediction, cloud analytics for consumption trends and adaptation for other perishable items. By combining automation and IoT, Storanion reduces food waste, improves sustainability, and delivers economic benefits to Indian households and vendors.

Conclusion

Storanion demonstrates how practical technology can address a pressing food storage challenge in India. By detecting spoilage early and maintaining optimal storage conditions, it reduces food wastage, protects household income and supports vendors' livelihoods. The system empowers users to monitor freshness remotely and respond proactively, promoting responsible consumption and sustainable practices. Its modular and scalable design allows deployment across homes, markets and restaurants, ensuring broader community benefits. By combining automation, IoT and creative thinking, the project provides a socially responsible, cost-effective and replicable solution. Storanion sets a model for sustainable food management that can be adapted nationwide.

Newton's Vibe

How Can We Reduce The Impact of Frequent Power Shortages in Rural Areas and Make Electricity More Reliable?

School Name:
Sacred Hearts High School, Kulashekara, Mangalore

India faces recurring power shortages despite its rapid expansion of renewable energy. The country aims to reach 500 GW of renewable capacity by 2030, yet energy reliability remains a significant challenge in several regions. In Karnataka, rural households, farmers and small businesses frequently experience power cuts due to limited generation and transmission constraints. Solar and wind energy, although growing rapidly, are not entirely reliable because of variable sunlight, changing weather and inconsistent wind patterns. Studies show that nearly 20% of renewable power is lost due to insufficient storage infrastructure. The reliance on expensive lithium-ion batteries that degrade over time and depend on imported raw materials with high environmental costs. This further limits consistent access to electricity for communities in the state.

Through the Shell NXplorers program, students at Sacred Hearts High School explored ways to store energy without using chemicals. Guided by their mentor, they designed a gravity battery named 'Newton's Vibe', a prototype that stores power using gravitational potential energy. The system lifts a weight when energy is available and releases it when required to generate electricity. This model is durable, low-cost and pollution-free, showing how young innovators can create sustainable solutions to strengthen India's clean energy future.

Newton's Vibe won second prize at the National Science Day Exhibition held at Mahatma Education Society's HOCL School, Rasayani, on February 27, 2025.

" Elevating Nature's Power for a Brighter Future "

Solution

The Newton's Vibe works by lifting a weight to store energy and releasing it in a controlled descent to generate electricity. The prototype uses a motorised pulley system connected to a generator. As the weight descends, it drives the generator, converting gravitational potential energy into usable electrical energy.

The system is built from cost-effective materials and includes mechanisms for real-time monitoring and efficiency testing. Unlike chemical batteries, this solution does not degrade with use, making it a more durable and reliable energy storage option. The gravity battery of Newton's vibe can last up to 50 to 60 years, making it one of the most dependable long-term storage options for renewable energy systems, particularly in rural or large-scale grid applications in India.

Conclusion

The gravity battery known as Newton's Vibe, shows how a simple natural force, gravity, can offer a practical solution to modern energy challenges. It avoids harmful chemicals and uses a scalable, low-cost design that supports off-grid areas, rural electrification and renewable energy systems. The prototype can be further improved by adding sensors to monitor energy levels, an automatic lifting system and stronger materials to improve storage efficiency. This concept illustrates how the NXplorers framework empowers young innovators to create practical solutions to real-world challenges, contributing to a cleaner, more reliable energy future for communities that still lack stable access to power.

Smart Farming App

How Do We Ensure That Farmers Effectively Improve Soil Productivity?

School Name:
P. A. Chinniah Raja Memorial Higher Secondary School, Rajapalayam, Virudhunagar

Agricultural productivity in India is often limited by reliance on traditional farming methods and a lack of proper data. Many farmers depend on experience or guesswork to decide which crops to plant and when to irrigate, leading to inefficient land use, low yields and financial losses. Studies show that India loses nearly 10 to 12 million tonnes of crops annually due to improper farming practices, inadequate soil management and pest infestations. Excessive use of fertilisers and unplanned irrigation further degrades soil health and wastewater quality. Climate change has increased the unpredictability of rainfall and temperature patterns, making it even more difficult for farmers to plan their cropping cycles effectively.

Addressing this challenge is critical for improving food security and sustaining rural livelihoods. After participating in the Shell NXplorers workshop, students at P. A Chinniah Raja Memorial Higher Secondary School developed the Smart Farming App. This mobile application uses sensors and machine learning to analyse soil quality, recommend the most suitable crops and irrigation schedules and enable farmers to make informed decisions, moving traditional agriculture toward a modern, data-driven approach.

" Know Your Land, Take a Stand — Let Data Guide the Farmer's Hand "
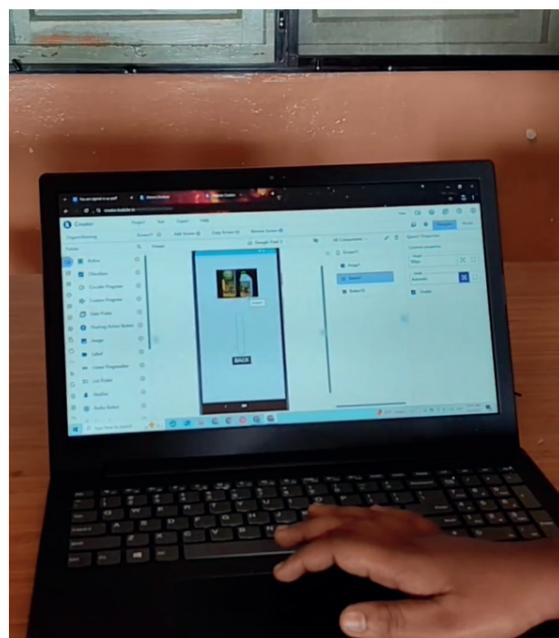
Solution

The Smart Farming App is an intelligent mobile application that provides comprehensive decision support for farmers. Its key feature is Soil Recognition, which allows farmers to input details manually or use external sensors to measure parameters such as pH, moisture and nutrient content in real time. Based on this information, the Crop Recommendation System suggests the most suitable crops for the specific soil, helping maximise yield and efficiency. The app also offers real-time Weather Updates to plan farming activities, Fertiliser Guidance to recommend optimal organic and chemical fertiliser use; Pest & Disease Alerts for early intervention.

This user-friendly platform reduces guesswork, promotes resource efficiency, lowers costs and supports eco-friendly farming practices. Future enhancements include AI-driven irrigation scheduling, predictive crop yield analytics, integration with local market pricing, automated alerts for government schemes and advanced farm management dashboards. These features of the app will help scale smart farming across rural India, improve income for small farmers and strengthen food security while preserving soil health and water resources.

Conclusion

The Smart Farming App empowers Indian farmers by transforming traditional farming into a data-driven and efficient system. Features such as soil analysis, crop recommendations, and real-time alerts help farmers plan effectively, optimise water use, and reduce excessive fertiliser application. By improving resource management and crop selection, the app increases yield and enhances income for small and marginal farmers. It supports sustainable practices that protect soil health and conserve water, directly addressing challenges faced by rural agricultural communities. The app ensures timely access to critical information, strengthening food security and economic stability while promoting modern, environmentally responsible farming across India.

Wave Watch

How Can We Manage Water Wastage and Optimize Energy Use in Rural Areas to Ensure Reliable Access to Water and Promote A More Efficient Lifestyle?

School Name:
Government High School, Koila, Bantwal taluk, Dakshina Kannada

India faces a growing water crisis, with over 200 million people living under high water stress and nearly 60% of groundwater resources declining. A significant contributor to this crisis is poor water management, leading to wastage, overuse and inefficient distribution. Many urban and semi-urban households depend on manual water supply and storage, which often leads to overflows, leaks, and unnecessary consumption.

To address this challenge, students from Government High School, Koila, under the Shell NXplorers Program, designed Wave Watch, a system

that integrates innovative water management at the corporate level. Large water tanks can be connected to the app to automate distribution, monitor usage in real time and ensure efficient supply to households. By reducing waste, preventing dry runs, and optimising water delivery, the system improves resource efficiency and lowers energy costs.

Wave Watch demonstrates how technology can support sustainable water management, empower communities, reduce environmental stress and secure water access for households across India

Scan the QR code and read the case study

" Smart Water,
Anytime, Every time! "

Solution

Wave Watch is a WiFi-enabled precision water-monitoring and automatic pump controller designed to improve water management efficiency. The system uses ultrasonic sensors to provide accurate, real-time water-level data across multiple tanks. Based on these readings, pumps are automatically regulated to prevent overflow or activate when levels fall below safe limits. Its remote monitoring capability via a mobile app allows administrators to track and gain better control over water management from anywhere, making it simple and reliable. The flexible sensor placement ensures easy installation and low maintenance while reducing common issues in older systems.

This innovation reduces water waste, conserves electricity, lowers operational costs, and improves efficiency. Future enhancements could include AI-driven predictive scheduling of water releases, integration with local weather forecasts, automated maintenance alerts, and expansion to support municipal water distribution in all rural, semi-urban, urban, and metro cities. Wave Watch demonstrates how combining technology with sustainable practices can empower citizens, improve resource management and strengthen water management in the face of increasing water stress.

Conclusion

The Wave Watch project demonstrates how young innovators can create practical solutions for India's pressing water challenges. By addressing water wastage and inefficient water management, the Wave Watch idea focuses on resource-efficient practices that can work together effectively. The system provides farmers with reliable, real-time insights and helps prevent unnecessary water and energy losses. Thanks to Shell NXplorers, the idea has developed into a functional solution with potential for large-scale adoption. Wave Watch represents a step toward more innovative water management, supporting agricultural productivity and promoting responsible resource management across rural India.

Foot Press Electricity Generator

How Can We Manage the Impact of Frequent Night-Time Power Shortages on Households, Industries and Schools in India that Depend on Continuous Electricity Supply?

School Name:
Karnataka Public School, Adugodi, Bangalore

India's electricity system continues to face pressure from rising demand, with national power consumption reaching around 148.48 billion units in March 2025, a 7% increase over the previous year. Despite growth in generation capacity, several regions still face night-time power shortages that affect households, industries and educational institutions. Dependence on coal-based power plants adds to pollution and operational costs. Large-scale infrastructure projects take years to complete, making them slow solutions to immediate challenges.

Understanding this challenge, students from Karnataka Public School, Adugodi, who attended the Shell NXplorers workshop, used NXplorers tools, such as scenario planning, to imagine a decentralised energy future and ripple-effect thinking to predict possible outcomes. Their idea evolved into the Foot Press Electricity Generator, a practical and scalable concept. Using materials available in their ATL Lab, the students built a working prototype that converts mechanical pressure from footsteps and moving vehicles into electricity when installed beneath roads. This simple, low-cost system can supplement existing power supplies and bring dependable energy to community and institutional spaces.

"Every Step, Every Wheel — Powering India Forward"

Solution

The Foot Press Energy Generator offers a decentralised power solution by converting mechanical pressure from footsteps and vehicle movement into electricity via a special mechanism that allows a motor to rotate and generate voltage. Installed beneath roads, pavements and staircases, these tiles capture everyday motion and store the generated energy in micro-grids to power streetlights, charge devices or act as emergency backups during power cuts. This innovation helps reduce dependence on conventional coal-based energy and supports cleaner, self-sufficient communities. It demonstrates how simple motion can be converted into a reliable, renewable source of electricity. The project strengthens urban and rural resilience by ensuring continuous energy access and reducing carbon footprints. In the future, the system can be enhanced with AI-based data analytics to monitor power generation patterns, integrate IoT-enabled control units for real-time performance tracking, and include innovative energy distribution modules for schools, metro stations, and rural areas, thereby expanding its potential as a futuristic urban and rural energy innovation for India's growing population.

Conclusion

The Foot Press Energy Generator turns everyday movement into clean, decentralised power by using roads, staircases, and public spaces as energy sources. This low-cost, scalable innovation reduces reliance on fossil fuels and ensures reliable local electricity for communities. With the potential to integrate intelligent energy management and wider application across cities and rural areas, it can help create self-sustaining spaces that meet their own energy needs. The idea reflects the power of creativity and problem-solving by young minds and reinforces the belief that every step we take can truly light the path to a greener India.

Hydra Cleaner

How Can We Manage Aquatic Waste and Pollution in Water Bodies Without Harming Marine Life and Freshwater Ecosystems?

School Name:
Vivekanand English High School, Kurla, Mumbai

India continues to face an alarming water pollution crisis, with untreated sewage emerging as the most significant contributor. Nearly 40 million litres of sewage flow untreated into rivers and water bodies every day. Over 70% of India's surface water is unfit for consumption, and more than half of its 605 rivers are severely contaminated. The leading causes include industrial effluents, plastic waste, and agricultural runoff, which have led to oxygen depletion, habitat loss, and the accumulation of toxins, threatening aquatic biodiversity and human health. Rapid urbanisation and industrial growth have made traditional waste management methods ineffective, particularly for underwater cleaning, where visibility and access are significant challenges.

To address this, students from Vivekanand English High School applied the NXplorers methodology using tools such as the Connection Circle, Scenario Planning Quadrant, Feasibility Funnel and Ripple Effect Diagram to develop Hydra Cleaner, a remote-operated submarine robot. Equipped with real-time sensors, cameras and metal detectors available in their ATL Lab, Hydra Cleaner performs targeted underwater waste collection with safety and precision, protecting aquatic ecosystems for future generations.

" Cleaning the Depths, Preserving Life "
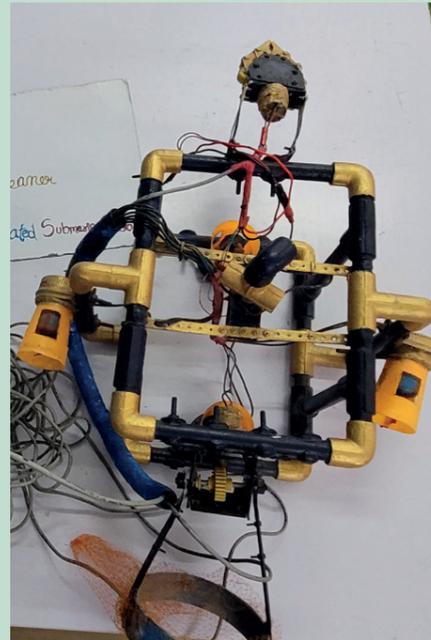
Solution

Hydra Cleaner is an innovative, remotely operated submarine robot designed to efficiently and safely clean underwater environments in India. It integrates real-time monitoring with advanced robotic capabilities to detect, collect, and remove submerged waste from rivers, lakes, and coastal waters. The system is equipped with a dynamic monitoring setup that measures water quality, pollution levels and debris concentration, enabling data-driven cleanup operations. Its robotic grabber arm, guided by live camera feedback, collects floating and submerged waste with precision, while integrated metal-detection technology identifies and effectively extracts metallic pollutants.

Manual control ensures human oversight during operations, reducing harm to aquatic life and maintaining safety. Future enhancements include autonomous navigation, AI-based object recognition, solar-powered operation and IoT-enabled reporting for real-time pollution tracking. This technology-driven approach improves underwater cleaning efficiency, supports environmental sustainability and offers a scalable solution for India. By combining innovation with ecological responsibility, Hydra Cleaner contributes to the preservation and restoration of aquatic ecosystems for present and future generations.

Conclusion

Hydra Cleaner represents a forward-looking solution for water conservation in India by integrating robotics, data analytics and sustainable design. It effectively removes underwater waste and monitors water quality, supporting long-term health of rivers, lakes and coastal waters. By enabling young innovators to think critically, the idea promotes responsible action toward protecting aquatic ecosystems. Hydra Cleaner demonstrates how technology can tackle complex challenges such as water pollution, ensuring cleaner water bodies and healthier biodiversity. With collective effort, continuous innovation and community engagement, it is possible to restore India's water systems and safeguard the environment for future generations.

Offshore Floating Energy

How Can We Increase The Energy Production to Meet The Food Demand in India?

School Name:
Vidyanand Bhavan High School, Nigdi Pradhikaran, Pune

Electricity plays a vital role in improving agricultural productivity in India. It powers essential processes such as irrigation, milling, grinding, and food preservation, helping farmers add value to their produce. Nearly 20% of India's total electricity is used in agriculture. Many rural areas still face frequent power cuts or limited access to electricity, forcing farmers to rely on manual labour and outdated tools, reducing efficiency and income.

Inspired by the NXplorers methodology and NXthinking approach, students of Vidyanand Bhavan High School identified the link between low food production and inadequate electricity supply. To address this challenge, they designed a prototype that harnesses energy from both solar power and water tides to generate sustainable electricity. This renewable energy can power irrigation systems and agricultural machinery, helping farmers reduce costs and improve productivity. The idea reflects how young innovators are creating practical, eco-friendly solutions for India's rural development.

" Powering Rural India through Sun and Tide "
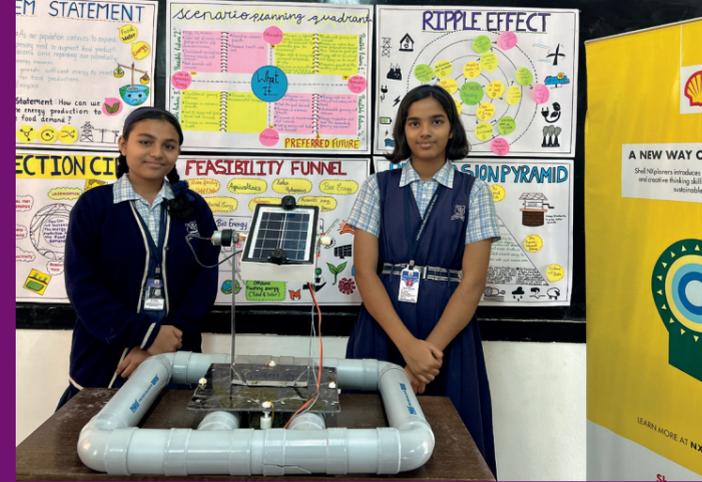
Solution

The students have created a prototype that generates clean energy from both sunlight and tidal currents. Floating platforms are placed in water bodies such as lakes, rivers and coastal areas, allowing them to move naturally with the rise and fall of tides. Solar panels are mounted on top of these floating platforms, enabling the prototype to generate electricity from solar power while remaining mobile on the water surface.

The design combines floating solar and floating tidal energy. Floating solar, also called floating photovoltaic, uses solar panels on reservoirs, dams and lakes to save land and reduce water loss. The tidal part captures energy from moving water and converts it into electricity through underwater turbines.

This model is suitable for Indian conditions, where many rural and coastal areas have access to water bodies but still face frequent power shortages. It offers a sustainable and affordable way to generate electricity for farming, fisheries and local communities.

Conclusion

The Offshore Floating Energy Project demonstrates how renewable technologies can create real impact by linking clean energy with food security. By combining floating solar and tidal systems, it generates reliable electricity while efficiently using underutilised water surfaces. This energy can be directed to critical agricultural processes such as irrigation, drying and milling, thereby directly supporting increased food production. At the same time, it reduces environmental impact, minimises water evaporation, and improves water quality. Future upgrades can include adding battery storage for continuous power, sensors to monitor energy generation, automatic alignment with tidal currents and IoT-based controls to optimise output and support rural Indian communities sustainably.
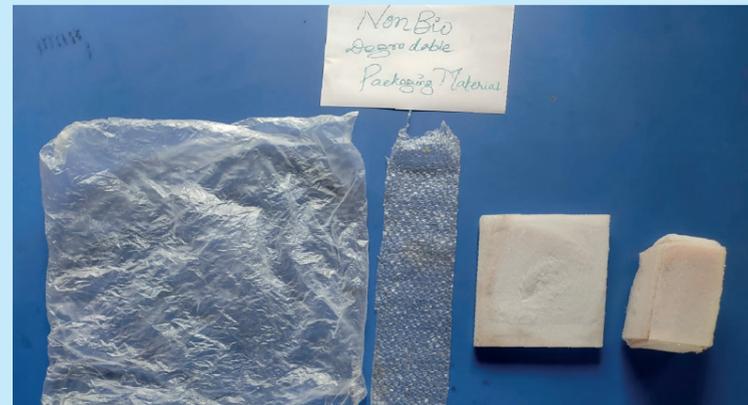
Eco-Col

How Can We Prevent Land and Water Pollution Caused by Thermocol and Plastic Waste to Protect Ecosystems and Public Health?

School Name:
Modern School & Junior College, Vashi, Navi Mumbai

Every year, millions of tons of thermocol and other non-biodegradable packaging materials accumulate in landfills and waterways across India, causing persistent pollution and endangering ecosystems and human health. Meanwhile, the rise of e-commerce and retail has increased demand for lightweight, protective packaging. Faced with this issue, students of Modern School, Vashi, wondered if there could be a solution that protects goods without harming the planet.

Their search led them to the Sholapith plant (Aeschynomene aspera), a spongy, lightweight species native to the wetlands of eastern India and the Sundarbans delta. Traditionally used in handicrafts, the plant now faces growing pressure from overharvesting and habitat loss. The students realized that sustainably harvesting and processing Sholapith could address both environmental and conservation challenges. Using equipment available at the school's Atal Tinkering Lab and guided by the NXplorers facilitator, they created Eco Col. These sheets provide sufficient cushioning for transporting goods and naturally decompose after use, leaving no microplastics or toxins behind.

> " Thermocol Harms, Eco col Cares by Packaging Nature's Way. "

Solution

Eco-Col offers a cost-effective, scalable solution for replacing thermocol and plastic in packaging. The process starts with sourcing the Sholapith plant, whose lightweight and porous stem is ideal for cushioning materials. Using simple tools such as a knife, blade, cutter, roller, tray, and dryer, the plant is processed into thin, flexible sheets. These sheets provide adequate protection during transport and decompose naturally after disposal without leaving microplastics or toxins.

Eco-Col can be produced at small-scale units, creating opportunities for local entrepreneurship and employment while reducing reliance on harmful synthetics. This method minimizes air, soil, and water pollution and supports circular economy principles by using renewable plant material. Although the material is initially less strong than thermocol, ongoing research aims to improve its durability and performance. By adopting Eco-Col, communities and industries can significantly reduce their environmental footprint and move toward a sustainable packaging ecosystem.

Conclusion

Eco-Col addresses the urgent problem of non-biodegradable packaging by providing a natural, plant-based alternative. Made from the Sholapith plant, its sheets are biodegradable, affordable and environmentally safe. By decreasing the use of plastic and thermocol, Eco-Col helps improve water quality, promote healthier soils, and reduce pollution. It also supports small-scale industries and job creation, making sustainability economically feasible. This student-led innovation demonstrates how young minds can rethink traditional practices to protect natural resources and spark a packaging revolution based on conservation and responsible consumption.

Eduserve 360

School Name:
SMS English Medium School, Bhramavara, Udupi, Mangalore

India produces almost 68.76 million tonnes of food waste each year, according to a recent study published on the National Centre for Biotechnology Information (NCBI) platform. This represents about one-third of all food produced in the country, despite millions still facing hunger and malnutrition. The Food and Agriculture Organisation estimates the economic loss from this waste at nearly Rs. 92,000 crore annually. A large portion of this waste happens during consumption, highlighting significant gaps in food distribution, awareness, and supply chain management.

Recognizing this issue, students of SMS English Medium School participated in the Shell NXplorers workshop. They used tools such as the Scenario Planning Quadrant, Feasibility Funnel, and Ripple Effect Diagram to design an innovative prototype called Eduserve 360 with materials available in their ATL Lab. Eduserve 360 aims to reduce food waste and support fair meal distribution in schools through mid-day meals and community canteens. The system employs innovative technology to monitor and regulate food serving by linking student identification with precise portioning, making it a cost-effective, scalable, and sustainable solution.

Scan the QR code and
read the case study

" Eduserve 360- Smart Serving, Smart Saving "

Solution

EduServe 360 is a smart food-serving and waste-monitoring system developed using the Shell NXplorers methodology. It operates in three stages to ensure fair food distribution and minimal wastage.

Stage 1: When students enter school, their RFID cards are scanned to record attendance and share the count with the food vendor, ensuring food is prepared only for those present.

Stage 2: During lunch, students scan the same RFID card, stand on a weighing scale and the load sensor dispenses the correct portion based on age, class, or health needs.

Stage 3: After meals, students dispose of leftovers in a sensor-based bin that tracks waste. Each student earns a score out of 10 based on the food they finish, encouraging responsible habits. Data collected assists in better planning and forecasting. In the future, EduServe 360 can incorporate AI-driven menu planning, automated vendor alerts, and IoT-enabled monitoring to improve efficiency. The system is simple, cost-effective and scalable for schools, hostels, and community canteens across India.

Conclusion

EduServe 360 offers an innovative, sustainable solution for managing food distribution and reducing waste in Indian institutions. By connecting RFID cards to automated portion control, it ensures each person receives the right amount of food while preventing over- and under-serving. The system also encourages responsible eating through a points-based motivation feature. It tracks attendance and consumption patterns, enabling better planning and resource management. Designed to be simple, cost-effective, and easy to scale, EduServe 360 can be implemented in schools, hostels, and community canteens, promoting fairness, accountability, and reliability in food management across India.

Earth Spore Pack

How Can We Prevent Plastic Packaging from Contaminating Water Sources and Harming Ecosystems and Human Health?

School Name:
Nutan Marathi Vidyalaya, Nerul, Navi Mumbai

Every year, the world produces over 400 million tonnes of plastic waste, with nearly half stemming from single-use packaging. A significant portion of this waste is never recycled and ends up in landfills, rivers, and oceans, where it persists for centuries. Consequently, microplastics have been found in food, water, and even human blood, raising concerns about long-term health effects. In India, plastic packaging is widely used across industries and households, while the agricultural sector produces large amounts of biodegradable waste that often remains unused.

Seeing this as both a challenge and an opportunity, students from Nutan Marathi Vidyalaya, Nerul, Maharashtra, attended the Shell NXplorers program and explored nature-inspired solutions. Using NXplorers' tools and systems thinking, they linked plastic pollution with agricultural waste and created the Earth Spore Pack. This fully biodegradable packaging is made from mycelium—a dense root-like network of mushrooms—and agricultural residues. Earth Spore Pack provides an innovative, sustainable alternative to plastic that is safe for both people and the environment.

" Redefining Packaging, Regenerating Earth "

Solution

Earth Spore Pack combines discarded materials like corn husks and wood chips with mycelium spores. Over a period of 4–7 days, the mycelium naturally binds the mixture together inside custom moulds, forming sturdy, lightweight structures. The growth process is then halted by baking, which also enhances durability.

The result is a packaging material that is:

- Compostable in 30–90 days, enriching soil instead of polluting it.
- Lightweight and sturdy, a natural alternative to Styrofoam.
- Breathable, antimicrobial, and heat-resistant, making it versatile for food, cosmetics, and electronics.
- Food-safe, with no harmful chemical leaching.

By turning agricultural by-products into eco-friendly packaging, Earth Spore Pack reduces waste at both ends, cutting down on plastics and giving new purpose to farm residues.

Conclusion

Earth Spore Pack is more than just a prototype; it is a bold vision of how innovation and nature can unite to tackle plastic waste. By converting agricultural by-products into compostable packaging, the students of Nutan Marathi Vidyalaya have demonstrated the power of circular economy thinking. Their project points toward a future in which sustainable packaging becomes the standard, reducing plastic waste, protecting ecosystems, and safeguarding human health.

Self Charging Boat

How Can We Manage Plastic Pollution in Oceans and Rivers to Protect Ecosystems and Communities that Depend on Them?

School Name:
PGDAV Sr. Sec School, Patel Nagar, New Delhi

Plastic pollution in India's rivers and oceans has become one of the most urgent environmental challenges. The country produces approximately 9.46 million tonnes of plastic waste each year, with around 40% remaining uncollected and entering rivers, lakes and coastal waters. The Ganges River alone is contaminated with microplastics, estimated to range from 1 to 3 billion particles, which eventually reach the oceans daily, disrupting aquatic ecosystems, harming biodiversity and threatening human health. High costs, dependence on external energy sources and low efficiency often limit the effectiveness of current solutions to this problem.

Recognising this problem, students at PGDAV Senior Secondary School developed the Self-Charging Boat Project as part of the NXplorers program. The concept of a self-charging boat was created after reviewing the NXplorers tools, such as the scenario planning quadrant, feasibility funnel, and ripple effect diagram. The idea combines renewable energy with water pollution management, as the electric boat collects floating plastic waste while producing its own power from solar and wind energy. By merging innovation and autonomous technology, the project offers a practical, scalable solution to reduce plastic pollution in India's water bodies and oceans for communities and future generations.

" Sail The Blue, with Green in View —
Self-Charging Power, Pure and True "
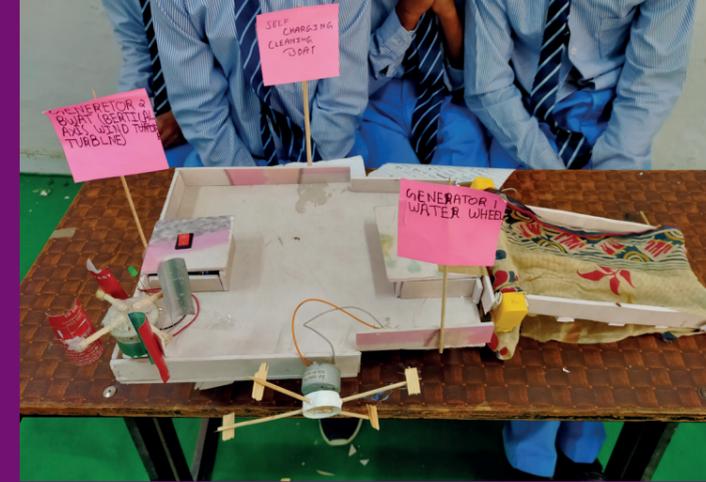
Solution

The Self-Charging Boat Project provides an innovative, eco-friendly approach to plastic pollution in India's rivers, lakes, and coastal waters. The boat is designed to gather floating plastic before it reaches deeper waters, where removal becomes more challenging. It is powered by a dual self-charging system, utilizing wind energy through a vertical-axis wind turbine and wave energy via a wheel connected to a motor that moves with ocean waves. Solar panels enhance energy production, storing excess power in an onboard battery to prolong operational time and range. During cleaning, the boat efficiently collects plastics while remaining fully electric and sustainable.

Future enhancements include AI-based object detection for accurate plastic identification, IoT-enabled real-time pollution monitoring, autonomous navigation for optimised cleaning routes, and water-quality sensors to monitor ecosystem health. By combining renewable energy with advanced tracking and collection, the Self-Charging Boat demonstrates how youth-led innovation can address water pollution and promote reliable technological solutions in India.

Conclusion

The Self-Charging Boat Project represents a unique innovation in tackling plastic pollution in India's rivers, lakes, and coastal waters. Unlike traditional boats powered by fuel or electricity, it produces its own energy through wind and solar sources, making operations sustainable and cost-effective. The boat gathers floating plastics, and excess energy storage allows for longer cleaning missions, increasing effectiveness. By addressing both water pollution and energy challenges, the project demonstrates the creativity, critical thinking, and problem-solving skills of young students. Their vision inspires action and emphasizes youth-led environmental stewardship.

Eco Coat

How Can We Reduce Electricity Demand During Summer Without Increasing The Surrounding Temperature in our Country?

School Name:
Salwan Boys Senior Secondary School, Old Rajinder Nagar, New Delhi

In hot summer months, electricity demand rises sharply as people depend heavily on air conditioners and coolers. This not only increases energy bills but also puts immense stress on power systems, sometimes leading to power outages. The excessive use of electricity further worsens pollution and accelerates global warming. After going through the NXplorers methodology, the students at Salwan Boys Senior Secondary School addressed this challenge, developing Eco-Coat, an innovative wall coating created from natural and eco-friendly materials, including cow dung, gypsum, chalk powder, quicklime and citric acid powder. Unlike regular plaster, Eco-Coat helps regulate indoor temperatures by absorbing heat during the day and releasing it when the temperature cools. This innovative idea demonstrates a practical approach to reducing the reliance on artificial cooling systems and promoting sustainable construction practices. Experiments comparing Eco–Coat–lined rooms with regular plastered ones highlight how it can keep homes cooler, reduce energy use and improve comfort in an eco-friendly way.

> " Eco-Coat: Nature's Shield, Comfort Revealed "

Solution

Eco-Coat operates on the principle of heat absorption and release, similar to the natural thermoregulation found in animals and plants. During the hottest part of the day, Eco-Coat absorbs excess heat from the sun and prevents it from penetrating the room. Later, in the evening or during cooler hours, the stored heat is gradually released, maintaining a balanced indoor temperature. Handmade bricks coated with Eco-Coat reduce heat entering a house by up to 70%, compared to 30–40% with regular walls and roofs. To test its effectiveness, students built two model rooms: one with normal plaster and another with Eco-Coat. Temperature sensors placed inside both rooms revealed a clear difference—the Eco-Coat room stayed significantly cooler, even under direct sunlight. This reduces the need for air conditioning and cuts down electricity consumption. By making indoor spaces more comfortable naturally, Eco-Coat offers a cost-effective and eco-friendly alternative to traditional cooling methods.

Conclusion

The Eco-Coat project demonstrates how simple, nature-inspired solutions can transform the way we design buildings for sustainable living. By significantly reducing heat transfer, Eco-Coat lowers dependence on air conditioning, resulting in lower electricity bills, improved comfort, and reduced carbon emissions. Beyond energy savings, it highlights the importance of using local, eco-friendly materials to create cost-effective alternatives for communities. Most importantly, the project sparks awareness among students and society about the possibilities of sustainable construction. Eco-Coat is more than just a material—it is a step toward building resilient, climate-friendly homes for a healthier and greener future.
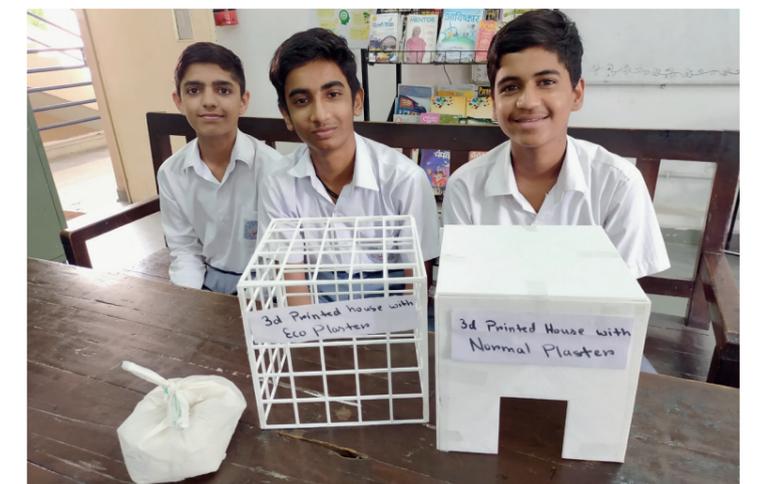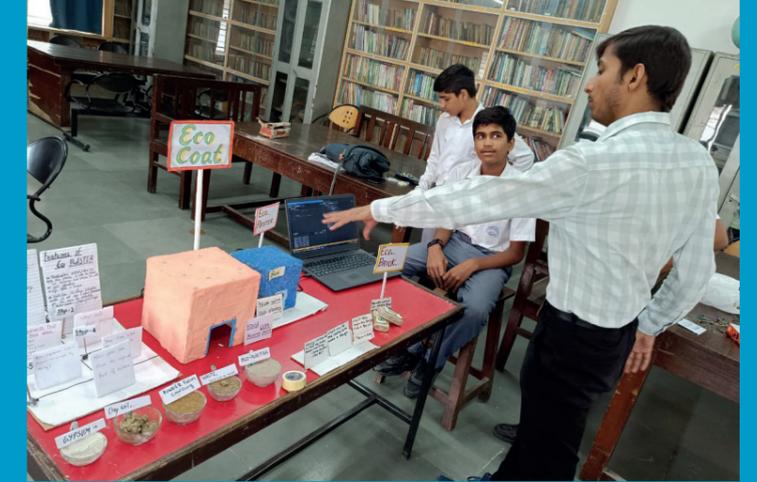
Portable Hydroelectricity Generator

How Can We Overcome Electricity Shortages in Farming Areas of Kudur Village, Without Increasing Overall Energy Demand?

School Name:
Mahanteshwara Kannada High School, Kudur, Ramanagara Dist, Bengaluru Rural

In Kudur village, farmers often face power cuts, which make it hard for them to use pumps and irrigation systems. Without sufficient water for their crops, due to power cuts, the harvest is affected, leading to less food production and difficulties for families that depend on farming for their livelihood.

Students from Mahanteshwara Kannada High School, Kudur, Ramanagara Dist, attended the Shell NXplorers program, where they explored the relationship between the frequent electricity shortages and the food production in their village. Using NXthinking methodology, they analysed the problem and developed an innovative solution, the Portable Hydroelectricity Generator. This idea supports the farmers in overcoming power issues and ensuring better yields for their crops. The students have received a Silver Award, under the category of Outstanding Student Team, at NXplorers Global Recognition Award 2021-22.

Scan the QR code and watch the video

" Go with the Hydroflow to the Endless Power Flow "

Solution

Portable Hydroelectricity Generator utilises the principle of a water turbine, traditionally found in dams, which converts the kinetic energy of flowing water into mechanical energy that moves the mini turbine to produce electricity.

The students adapted this concept on a smaller scale by connecting a DC motor attached to a modified turbine, which is kept inside a water pipe. As water flows through the pipe, it spins the turbine, which is connected to the axis of the DC motor, thereby generating electricity that can power an LED bulb. This simple yet effective setup demonstrates a renewable, sustainable and low-cost method of electricity generation suitable for farms and small-scale applications.

The prototype is portable, easy to implement, and scalable, allowing farmers to access electricity for irrigation pumps, lighting and other farm-related activities. The student's innovation not only addresses the local power shortage but also encourages the use of eco-friendly energy solutions in the Kudur rural community.

Conclusion

A Portable Hydroelectricity Generator has been successfully implemented on a farm in Kudur village to produce electricity. It is an innovative, practical and community-focused solution that helps farmers in Kudur village improve electricity usage for crop production. It can be further modified by embedding low-cost sensors to measure water flow, turbine speed, power output and monitoring real-time data on a mobile application, allowing the farmers to remotely monitor potential issues like debris clogs or low water levels and track the amount of electricity generated.

Smart Food Preservative

How Can We Increase the Shelf Life of Fruits and Vegetables While Preserving their Nutritional Value for Consumers?

School Name:
Vishwakarma Vidyalaya, Bibwewadi, Pune

India, the world's second-largest producer of fruits and vegetables, loses nearly Rs 13,300 crore worth of fresh produce every year due to inadequate cold storage and limited refrigerated transport. Climatic conditions, extended supply chains, and insufficient storage lead to spoilage, and vendors often sell overripe or damaged produce, increasing consumers' health risks. Fruits and vegetables, while rich in nutrients, can become harmful if improperly stored, as they can develop bacteria, fungi, and toxins. According to the Food and Agriculture Organisation, fruits and vegetables account for the highest proportion of food losses, with up to 60% ending up in landfills.

Students from Vishwakarma Vidyalaya in Pune attended the Shell NXplorers workshop and observed this massive waste in local markets. Applying the NXplorers methodology using tools such as the Scenario Planning Quadrant, Feasibility funnel tool, etc., they developed Smart Food Preservative, a prototype built with materials from their ATL lab to reduce nutrient loss, maintain freshness, and minimise spoilage. The idea addresses food security and health challenges while strengthening India's agricultural supply chain. It won first prize at the Shodh 2024, conducted by Jayawant Shikshan Prasarak Mandal Pune; was showcased at Seed the Future by Dassault Systems and selected as one of the top ten; and was also presented at the World Robotics Olympiad, a national event.

" Nutrients Retained, Waste Contained! "

Solution

The prototype operates with two integrated systems. The cooling system uses a DHT11 sensor to detect ambient temperature. If the temperature exceeds 20°C, the system activates to cool the environment and turns off when the temperature drops to 15°C, ensuring efficient cooling without energy waste. This smart control maintains the quality and freshness of stored goods. The drying system employs a temperature sensor to monitor the drying process of vegetables. The Arduino Uno processes the data and activates a fan to stop airflow when the temperature exceeds the set limit, cooling the drying unit. When the temperature drops below the limit, the fan turns off, allowing air circulation to continue drying. This automated process maintains ideal drying conditions, conserves energy, and prevents over-drying.

Future enhancements include IoT-enabled sensors for remote monitoring, AI-based predictive analytics to optimise cycles according to weather and crop type, and solar-powered systems to reduce reliance on conventional electricity, making the solution sustainable in rural and off-grid areas.

Conclusion

Smart Food Preservative provides an innovative, automated solution to enhance agricultural efficiency in India. Using sensors and Arduino Uno for real-time temperature monitoring and control, it maintains optimal conditions for preserving and drying fruits and vegetables. The cooling system keeps the storage environment stable while the drying system efficiently removes moisture without over-drying. Together, they reduce manual effort, conserve energy and improve the quality and shelf life of produce. This prototype offers a sustainable and scalable approach to post-harvest management, empowering Indian farmers with smart technology to minimise food losses and increase agricultural productivity.
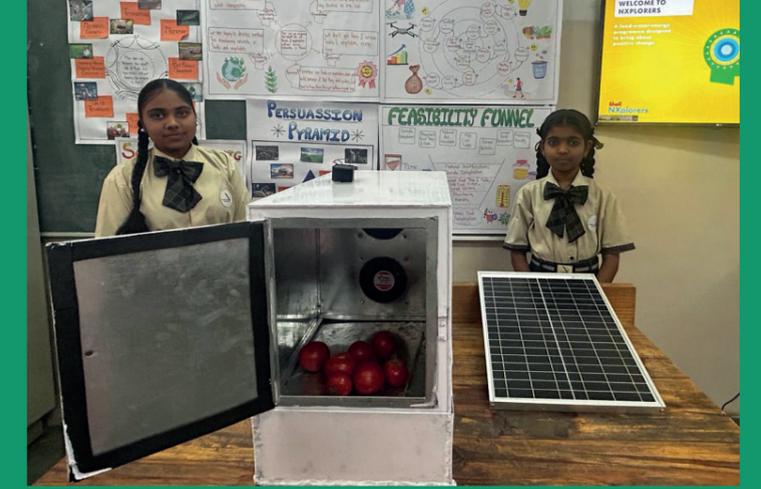
Nature Vend

How Can We Manage the Growing Problem of Single-Use Plastic and Metal Waste in India to Reduce Environmental Pollution?

School Name:
P. A. Chinniah Raja Memorial Higher Secondary School, Rajapalayam, Virudhunagar

India produces over 3.3 million tonnes of plastic waste every year, with single-use plastics and metals contributing heavily to urban pollution. Improper disposal of these materials contaminates soil and water, harms wildlife and adds to environmental challenges that conventional waste management systems struggle to address. With urbanisation and consumption on the rise, the gap between waste generation and effective recycling continues to widen, increasing the pressure on landfills and local ecosystems.

Observing this growing problem, the students of PACM Higher Secondary School, after attending the NXplorers program, applied their learning to develop Nature Vend, an innovative vending system designed to efficiently tackle single-use plastics and metal waste. By integrating sustainability into technology, the students showcased how environmental issues can be addressed through creative thinking and scientific application. Operating with energy-efficient technology and solar power, Nature Vend not only reduces pollution but also promotes awareness, accountability, and collective action towards responsible waste management, inspiring communities to build a cleaner, greener India.

" Innovating Today for a Plastic-Free Tomorrow "

Solution

Nature Vend is an innovative vending system designed to manage single-use plastics and metal waste effectively while promoting sustainability. It operates through a conveyor belt mechanism that collects waste items and sorts them automatically. Plastics are separated and directed for recycling, while metals are treated with a sodium solution that decomposes certain types instantly, reducing the volume of waste reaching landfills. The system runs on energy-efficient technology powered by solar panels, minimising carbon emissions and operational costs. Nature Vend can be upgraded with IoT sensors for real-time waste tracking and AI-based sorting to improve precision and efficiency. It can also be scaled for use in both urban and rural areas to promote responsible waste management and environmental awareness. By integrating mechanical sorting, chemical treatment and renewable energy, Nature Vend provides an innovative, reliable and replicable solution for cleaner surroundings, reflecting the power of youth-led innovation in addressing India's growing waste crisis.

Conclusion

Nature Vend's pioneering waste management system marks a significant step towards a sustainable future. By harnessing innovative technology and eco-friendly design, it offers a promising solution to the pressing issue of single-use plastics and metal waste. As communities and organisations adopt such systems, we can collectively work towards a cleaner, healthier environment and a brighter future for generations to come. This innovative approach has the potential to transform global waste management practices. By embracing such solutions, we can reduce pollution, conserve resources and create a more sustainable world. As we move forward, it's essential to continue investing in and adopting technologies that prioritise the health of our planet. Together, we can build a future where waste is minimised and resources are valued. Nature Vend's system is a step in the right direction.

Agri-Tech

How Can We Improve Traditional Farming Practices in India to Address High Manual Labour, Inefficient Resource Use and Rising Energy Demands that Reduce Productivity and Farmer Well-Being?

School Name:
Sri Ramana Mont. Matric Sec School, Rajapalayam, Virudhunagar

Traditional farming in India still relies heavily on manual labour, with nearly 55% of the workforce engaged in agriculture but contributing only 18% to the national GDP, highlighting low productivity. Studies show that farmers spend up to 70% of their effort on repetitive physical tasks such as irrigation, sowing and harvesting. In addition, outdated irrigation systems lead to nearly 60% water wastage, while dependence on diesel and grid electricity increases farming costs and carbon emissions.

Students from Sri Ramana Montessori Matriculation Higher Secondary School identified these challenges during the Shell NXplorers Juniors program. Using NXplorers tools, such as the consequences circle, they explored and brainstormed ideas related to the energy, labour and reliability in agriculture. Guided by the NXplorers Methodology, they designed Agri-Tech, a model that integrates automation with renewable energy to make farming more efficient and less labour-intensive. The concept promotes resource optimisation, reduces farmer fatigue and advances reliable agricultural practices that support both productivity and environmental balance.

> " Sow with Sun, Reap with Ease;
> Greener Farms, Greater Peace "

Solution

Agri-Tech Automation with Free Energy is an innovative farming system designed to support Indian farmers who face challenges with manual labour, high energy costs and water waste. The solution uses solar panels to generate renewable energy that powers farm tools and irrigation systems, helping farmers save on electricity costs and reduce expenses. The Arduino-based, innovative irrigation system ensures water is released only when needed, preventing waste and improving soil health. Farming tools are fitted within PVC pipes for easy access and smooth operation, reducing physical effort during cultivation. The team plans to include AI-based sensors to monitor soil moisture, crop health and weather conditions. A mobile app will also be developed for remote irrigation control and real-time farm updates.

By combining automation, solar power and innovative technology, Agri-Tech Automation with Free Energy makes farming more efficient, reliable and farmer-friendly while supporting India's mission for green and self-reliant agriculture.

Conclusion

Agri-Tech marks a significant shift toward reliable farming in India. Using solar power for automation and smart irrigation reduces manual labour, energy costs, and water waste. This innovative system empowers farmers with an efficient and affordable solution that makes farming easier and more productive. Agri-Tech strengthens rural livelihoods, supports resource conservation and promotes eco-friendly agricultural practices. It stands as a model for modern, self-sustaining farming that balances productivity with environmental care, reflecting India's vision for a greener and more resilient agricultural future.

Spinnergy

How Can We Address Limited Battery Efficiency and Short Driving Range in Electric Vehicles that Reduce Usability for Consumers?

School Name:
St Joseph English High School, Kulashekara, Mangalore

India is witnessing the rapid adoption of electric vehicles, yet challenges in battery efficiency and driving range remain significant. Studies indicate that EV users in urban and semi-urban areas often travel shorter distances due to frequent charging needs, and that nearly 30% of the potential energy generated by vehicle motion goes unused. Inefficient energy utilisation not only limits the practicality of EVs but also affects cost savings and environmental benefits.

Students from St Joseph English High School, Kulshekar, Mangalore, explored this challenge during the Shell NXplorers program. Using NXplorers tools such as the Connections Circle, Scenario Planning Quadrant, and Feasibility Funnel, they analysed how energy produced by spinning wheels could be recovered and reused. Thus, the students identified opportunities to improve battery efficiency and extend driving range while reducing dependency on external charging. Their solution, Spinnergy, introduces a kinetic energy recovery system that captures rotational energy from wheels and converts it into electricity to support the main battery. The project demonstrates how youth-led innovation can contribute to reliable, efficient and self-sufficient electric mobility in India.

" Charge Less, Go Beyond: Turning Every Spin into Extra Miles "

Solution

The Spinnergy solution integrates compact wheel-mounted kinetic energy recovery units that capture rotational energy from electric vehicle wheels and convert it into usable electrical power. Each unit uses a low-inertia generator with a torque-optimised transmission to harvest energy efficiently in both urban stop-start traffic and steady highway conditions. Power electronics include a bidirectional DC/DC converter and an intelligent energy management system that conditions harvested power, prevents backflow, and prioritises battery support or auxiliary loads. A vehicle controller coordinates regeneration with the braking system to maximise energy recovery without affecting drivability or safety. The modular design allows retrofitting to different EV platforms with minimal impact on vehicle weight. In the future, Spinnergy can integrate AI-based predictive energy management to optimise regeneration based on driving patterns and traffic conditions. Also, IoT connectivity can enable real-time monitoring and data analytics for fleet management. By converting otherwise wasted rotational energy into electricity, Spinnergy increases driving range, reduces charging frequency, lowers operational costs and supports sustainable, efficient and eco-friendly electric mobility in India.

Conclusion

Spinnergy shows how everyday vehicle motion can be converted into clean, local energy, reducing dependence on fossil fuels and supporting India's transition to reliable transport. Beyond improving electric vehicle efficiency, it develops technical understanding, encourages innovation and raises awareness about energy conservation among youth. Collaborating with schools, communities and local technicians ensures long-term adoption and maintenance. Future enhancements could include AI-based energy management, IoT monitoring for real-time performance tracking, and integration with other renewable energy sources to further extend driving range. These improvements would strengthen India's sustainable mobility, lower carbon emissions and inspire practical, youth-led innovations in clean energy.

AgriCare Comfort

How Can We Utilise Agricultural Waste to Benefit Farmers, Communities and the Environment in a Safe, Affordable and Sustainable Way?

School Name:
Modern School & Junior College, Vashi, Navi Mumbai

Every day in India, millions of sanitary pads are discarded, most of which are made from non-biodegradable plastics that take 500–800 years to decompose. Improper disposal methods, such as open dumping or burning, release toxic emissions that pollute both air and water bodies, posing health risks to sanitation workers. The situation is worse in rural areas where access to safe and affordable menstrual products is limited, forcing women to resort to unsafe alternatives.

Recognising this urgent challenge, students from Modern School, Vashi, Navi Mumbai, developed AgriCare Comfort, a biodegradable sanitary napkin made from natural materials. This innovation was inspired by the Shell NXplorers program attended by the students, where they explored sustainable solutions to real-world challenges. By combining menstrual hygiene needs with environmental responsibility, their vision redefines how society approaches both agricultural waste management and women's health.

AgriCare Comfort, a Top 25 finalist nationwide at the prestigious Social Impact Awards, a Global sustainability competition, is now undergoing incubation to further participate at the Global level.

> " Nature's Care, Every Month "

Solution

AgriCare Comfort is a biodegradable sanitary napkin made from natural materials such as banana pseudostem fabric, ensuring comfort, breathability and skin safety. Each pad is infused with orange peel powder, providing natural antibacterial protection and a mild fragrance, and reinforced with a seaweed extract-based barrier that makes it leak-proof while remaining fully compostable. Unlike conventional plastic-based pads that take centuries to decompose, these eco-friendly pads break down within months, reducing environmental pollution and waste in landfills. Designed to be affordable, AgriCare Comfort can reach women in both rural and urban communities, improving menstrual hygiene and health. Beyond personal care, the initiative creates employment opportunities for rural communities, supporting local economies and skill development. By combining sustainability, accessibility and empowerment, AgriCare Comfort demonstrates how simple innovations can improve women's health, protect the environment and contribute to social and economic development across India.

Conclusion

AgriCare Comfort is more than just a sanitary napkin; it is a platform for empowerment, sustainability and dignity. It is a zero-plastic, biodegradable solution that protects women's health and cares for the planet simultaneously. Its unique integration of agro-waste utilisation and eco-friendly design highlights how youth-driven innovation can spark lasting change. If scaled widely, AgriCare Comfort could revolutionise menstrual health practices by reducing plastic waste and fostering a culture of sustainable consumption for future generations.

Rebrew Plastic

How Can We Utilise Cafe Waste to Improve Soil Health and Reduce Environmental Impact?

**School Name:**
Nutan Marathi Vidyalaya, Nerul, Navi Mumbai

India alone produces over 2.5 lakh tons of coffee waste annually, intensifying environmental stress. The rising number of cafés has led to an unprecedented increase in coffee waste, particularly used coffee grounds, which often end up in landfills. When disposed of irresponsibly, these grounds release methane gas, a potent contributor to climate change, and their acidic components degrade soil health, obstructing plant growth and disturbing natural ecosystems.

Despite containing valuable nutrients, untreated coffee waste can cause soil compaction and poor drainage, reducing fertility and long-term sustainability. Through the Shell NXplorers program, students examined the environmental consequences of café waste and designed a circular solution that repurposes discarded coffee grounds into eco-friendly products. Their innovation, Rebrew Plastic, reimagines waste as a resource by transforming coffee residue into biodegradable plastic alternatives and sustainable candles, ensuring that nothing goes to waste. This approach reduces pollution, safeguards soil health, and fosters responsible consumption for a cleaner planet.

" From Every Brew, a Greener View "
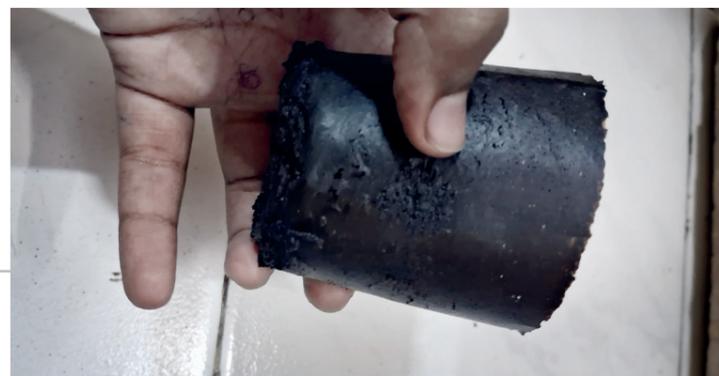
Solution

The Rebrew Plastic project provides an innovative and sustainable approach to managing cafe waste by converting used coffee grounds into eco-friendly products. Students from the NXplorers program combined coffee grounds with cornstarch and water to create a biodegradable material that can be moulded into practical items such as cups, containers and trays. These products serve as safe alternatives to single-use plastics, reducing environmental pollution. In addition, the coffee grounds are reused to make scented candles by mixing them with recycled wax, natural fragrances, and cotton wicks, resulting in a sustainable, aromatic product. This dual-purpose system not only limits the accumulation of cafe waste but also reduces greenhouse gas emissions and prevents soil contamination. In the future, the team plans to explore integration with other agricultural or food waste streams, develop larger-scale manufacturing methods, and introduce digital monitoring to ensure quality and consistency. Rebrew Plastic can also be adapted for community workshops and local businesses, promoting awareness of circular economy practices. The project demonstrates that simple, locally available materials can drive innovation while supporting sustainable consumption and environmental protection in India.

Conclusion

Rebrew Plastic showcases how innovative thinking can transform everyday waste into meaningful, eco-friendly solutions. By converting discarded coffee grounds into biodegradable plastics, the project eliminates harmful disposal practices and protects soil from degradation. It promotes a waste-to-resource approach, aligning with circular economy principles and encouraging sustainable living. Through the NXplorers methodology, students applied critical thinking, collaboration, and creativity to reimagine waste management. This initiative not only reduces environmental impact but also inspires communities to adopt greener alternatives.

Kisan Smart Farming

How Can We Address Food Scarcity in Rural Farming Communities Where Low Income and Limited Resources Prevent Farmers From Achieving Sustainable Livelihoods?

School Name:
Government Boys Senior Secondary School, Rajokri, Delhi

In India, more than 85% of farmers are small or marginal, owning less than two hectares of land, and almost 30% of them live below the poverty line. Even though they are the backbone of the nation's food security, most farmers face financial difficulties due to high input costs, volatile market prices and limited access to consumers. The unfair role of middlemen reduces their earnings, even when food prices increase in cities. This not only affects farmers but also makes it difficult for consumers to buy vegetables and grains at reasonable rates. The lack of awareness of modern farming methods, digital tools, and government schemes adds to the problem, leaving many farmers unprepared for changing agricultural conditions.

To solve this issue, a student from Government Boys Senior Secondary School, after attending the Shell NXplorers workshop, created a smart farming app known as KISAN. Growing up in a farming family in Uttar Pradesh, the student has witnessed the struggles of his grandfather and other farmers in his community. His idea is to build a digital platform that directly connects farmers and consumers, while also providing farmers with the knowledge, tools, and resources needed for sustainable, profitable farming. The project qualified for the IRIS National Science Fair (Stage I – ISEF) and was showcased at MIT LaunchX.

" KISAN in Hand,
Prosperity on Land "
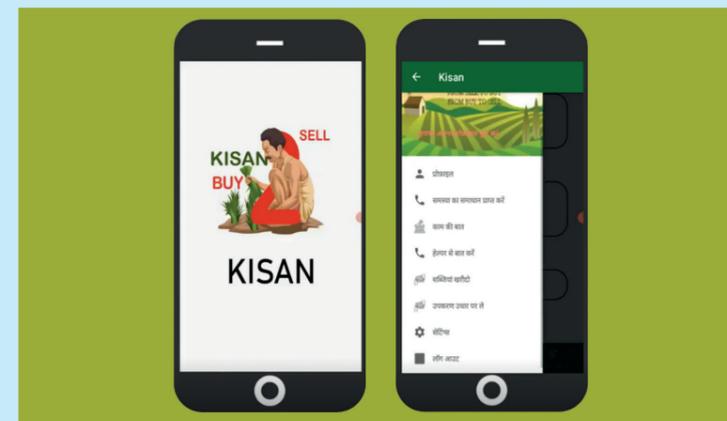
Solution

The KISAN: Smart Farming App provides a complete digital solution to address farmers' financial struggles and improve the quality of agricultural production in India. The app enables farmers to sell their crops directly to consumers through its in-built delivery API, ensuring fair prices for both parties and eliminating middlemen. Its "KAM KI BAAT" section provides farmers with continuous updates on modern farming practices and government schemes, helping them adopt new techniques to increase productivity and reduce costs. Another unique feature allows farmers to rent or lease agricultural equipment from nearby farmers, making farming more efficient and affordable.

The app uses a secure Google-powered database to store information safely and manage transactions transparently. Farmers can also access helpline services and transport assistance for crop delivery. In the future, the student plans to integrate drone-based monitoring to display soil moisture, temperature and weather conditions in real time. He also aims to add multilingual support and AI-based advisory features, making the KISAN app a faithful digital companion for every Indian farmer.

Conclusion

KISAN: Smart Farming App is a remarkable student-led innovation that addresses real-world challenges. Based on farmers' experiences, it provides practical solutions through direct market access, modern farming knowledge, and cost-sharing for equipment. The app empowers farmers to increase productivity and profit while enabling consumers to access fresh produce at fair prices. With future additions like drone-based monitoring and multilingual support, KISAN can expand into a large-scale, reliable platform. It exemplifies the NXplorers approach of turning ideas into meaningful, community-driven solutions that strengthen Indian agriculture and support rural livelihoods.
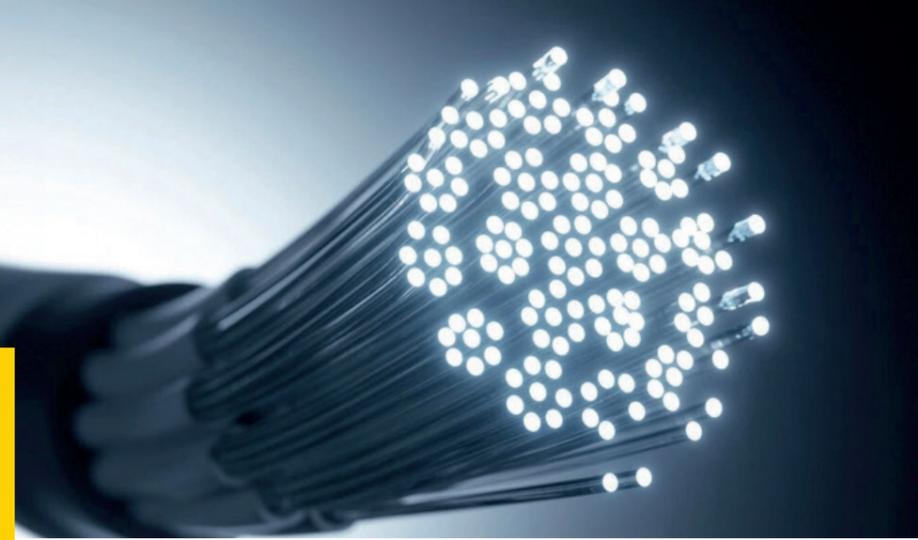
Solar Thread

How Can We Help Households and Communities in India Conserve Electricity to Ensure Reliable Energy for Future Generations?

School Name:
Salwan Boys Senior Secondary School, Old Rajinder Nagar, New Delhi

India's electricity consumption reached 1,774 billion kilowatt-hours in 2024 and continues to grow at around 6-7% annually. Nearly 30% of household energy is used for lighting, putting immense pressure on the power grid, increasing electricity costs and contributing to environmental pollution. According to the Central Electricity Authority, over 40 million households in India face irregular power supply, while excessive electricity use in cities adds to carbon emissions estimated at 2,400 million tonnes annually. Many families struggle to pay monthly bills while indirectly accelerating climate change through excessive energy use.

Students from Salwan Boys Senior Secondary School, Old Rajinder Nagar, attending the NXplorers workshop, explored these challenges and applied NXplorers tools, such as the Connections Circle and Scenario Planning, to design Solar Thread. This student-led innovation channels natural sunlight into indoor spaces. This system provides illumination for 6 to 7 hours daily, reducing electricity usage, lowering household costs and promoting reliable energy habits. Solar Thread demonstrates how low-cost, science-based solutions can transform energy use while benefiting households and the environment.

“ Solar Thread – Weaving the Sun, Lighting Everyone ”
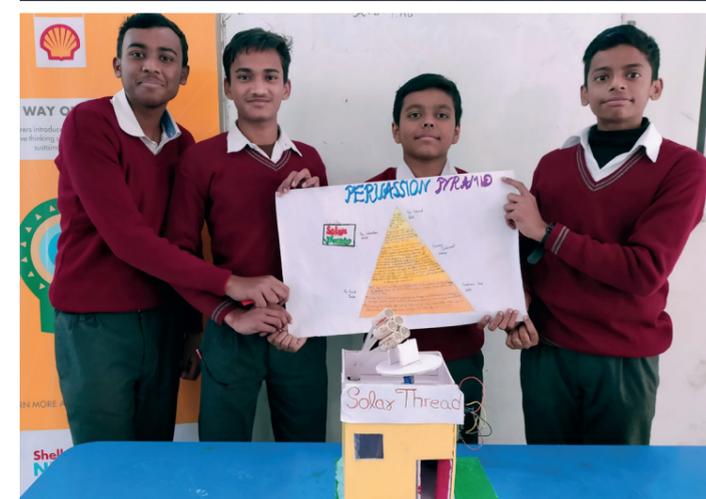
Solution

Solar Thread is a sustainable system that uses the principle of Total Internal Reflection to channel natural sunlight into indoor spaces, reducing reliance on electricity. The system consists of a Collector and a Distributor. The Collector captures sunlight through plano-convex and plano-concave lenses, enhanced by a reflector sheet and a slider mechanism, which allows precise positioning of optical fibres for maximum light capture. Sunlight travels through the optical fibre cables to the distributor, which evenly spreads light across rooms, illuminating areas that usually depend on artificial lighting.

The upgraded prototype ensures higher intensity, uniformity, and easier installation, making it suitable for Indian classrooms, offices, and homes with limited windows. Future enhancements include IoT-enabled sensors to monitor light intensity and energy savings, modular fibre extensions for larger areas and optional low-power LED integration for cloudy days. By combining optical physics with a scalable, low-cost design, Solar Thread provides a practical, eco-friendly solution that reduces electricity consumption and lowers carbon emissions.

Conclusion

Solar Thread provides a practical, low-cost way to reduce daytime electricity use by channelling natural sunlight into indoor spaces. This student-led innovation demonstrates how practical science can be applied to promote sustainability and energy conservation. By illuminating areas with limited access to windows, it lowers electricity bills and reduces dependence on non-renewable energy sources. Future enhancements such as compact designs and intelligent lighting controls could further improve efficiency and usability. Solar Thread inspires environmental responsibility and encourages the adoption of reliable living practices, showing how simple yet innovative solutions can make a meaningful impact on energy conservation in Indian households and communities.

Filtrowell

How Can We Improve Safe and Reliable Access to Clean Drinking Water in Off-Grid and Resource-Limited Areas to Support the Health and Well-Being of Vulnerable Communities?

School Name:
Salwan Girls Senior Secondary School, Rajinder Nagar, New Delhi

India faces a severe water crisis, with over 163 million people lacking access to safe drinking water and nearly 70% of surface water deemed polluted. Millions rely on contaminated sources carrying bacteria, toxic chemicals and microplastics, leading to waterborne diseases such as cholera, diarrhoea and typhoid. Unsafe water consumption is a major cause of illness and child mortality, highlighting the urgent need for sustainable, low-cost solutions.

Using NXplorers methodology, the students at Salwan Girls Senior Secondary School applied tools such as the Connections Circle, Feasibility Funnel, and Ripple Effect Diagram to understand challenges, assess impacts, and design an effective solution. Students conceptualised Filtrowell as an affordable, eco-friendly and community-friendly water filtration system. Filtrowell uses locally available natural materials and a double PVC pipe structure with layered filtration media to provide safe drinking water without external power. Its simple design ensures ease of use and easy replication. By combining innovation with practical design, Filtrowell empowers rural households and communities to ensure safe, reliable access to drinking water.

Scan the QR code and watch the video

> " Filtrowell - Clean Water, Clean Life – End the Struggle, End the Strife! "

Solution

The Filtrowell system uses a double PVC pipe design, with the space between the outer six-inch and inner three-inch pipes filled with sequential filtration layers. Contaminated water enters from the bottom through a hand pump and passes through each layer. The gravel layer removes large debris and suspended particles. The quartz and silica sand layers filter finer impurities. Ceramic rings trap solid particles and provide additional mechanical filtration. Seaweed, such as wakame, effectively captures microplastics. Activated carbon adsorbs harmful chemicals, odours and toxins. The cotton or nylon micro-mesh serves as the final barrier, ensuring that safe, clean water exits the outlet.

Test results showed that Filtrowell significantly reduces turbidity, removes microplastics larger than 120 microns, improves taste and provides safer drinking water for households. In the future, the students plan to include solar-powered pumps for automated water flow, IoT-enabled sensors to monitor water quality in real time, and multilingual digital guides for easier maintenance. The system is affordable, sustainable and scalable for rural households, schools and community water programs across India.

Conclusion

Filtrowell is an innovative, homegrown solution that addresses the challenge of ensuring safe drinking water. It's a simple scientific design that uses natural materials to provide adequate filtration without relying on electricity or costly equipment. By reducing turbidity, improving water quality and trapping microplastics, it directly benefits the health of vulnerable communities. Test results confirm its reliability and effectiveness. With further development, Filtrowell can be scaled for household and community use and may integrate renewable energy-based sterilisation for enhanced efficiency. It represents a practical step toward ensuring safe water access, promoting healthier lives and sustainable futures across India.

Natural Ripener

How Can We Reduce the Harmful Use of Chemicals for Fruit Ripening that Affects Health, Increases Food Waste and Raises Costs for Farmers and Vendors?

School Name:
Kendriya Vidyalaya, Anna Nagar, Chennai

India produces over 30 million tonnes of bananas annually, making it the largest producer globally and accounting for almost 26% of global production. Yet around 30-40% of fruits and vegetables are lost due to improper handling and artificial ripening, leading to significant economic and health concerns. To meet consumer demand, vendors often use calcium carbide, a banned chemical, to hasten ripening. The residues of calcium carbide, which include arsenic and phosphorus, pose serious health risks, including neurological disorders, stomach irritation, and even cancer. Students from PM Shri Kendriya Vidyalaya, after attending the

Shell NXplorers program, applied tools such as the Connections Circle to map the relationships among unsafe ripening practices, health hazards, and food waste. They also used the Scenario Planning Quadrant to explore alternative, safer ripening methods that can be scaled across farms and markets. By understanding the systemic impact, students identified the need for a natural, low-cost and reliable solution that ensures fruit quality and consumer health while reducing environmental and economic losses. Thus, the idea of Natural Ripener was born to meet consumer demand and affordability.

Scan the QR code and watch the video

"Ripen Naturally,
Live Healthily."

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Solution

The Natural Ripener project provides a sustainable alternative to chemical ripening by using ethylene-emitting fruits such as apples, pears, and tomatoes to naturally ripen bananas and other climacteric fruits. Unripe bananas are placed in a controlled environment with these natural ripeners. Ethylene gas released by companion fruits accelerates ripening evenly without chemicals, preserving flavour, aroma and nutritional value. The system uses simple insulated chambers to maintain consistent humidity and temperature. A small fan ensures proper air circulation and uniform ripening. Students tested different combinations of natural ripeners to optimise speed and quality. Results demonstrated even ripening in 3–5 days with no chemical residues.

Future enhancements include integrating low-cost sensors to monitor temperature and humidity, providing mobile notifications to farmers and vendors on optimal ripening times, and scaling the solution for community markets. This approach reduces food waste, improves consumer safety and strengthens farmer incomes sustainably.

Conclusion

The Natural Ripener project offers a practical, affordable and chemical-free method to ripen fruits while preserving their nutritional value and safety. By replacing hazardous substances with ethylene-emitting natural fruits, it protects consumers from health risks and reduces food wastage. The system is simple, replicable and scalable for farmers, vendors and households, promoting safer agricultural practices across India. Its adoption can lower costs, increase profitability for farmers and vendors and improve public health. Natural Ripener demonstrates how student-led innovation, combined with scientific principles, can deliver sustainable solutions to pressing food safety and environmental challenges.

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Hy Aqua Harvest

How Can We Meet the Increasing Food Demand in India While Ensuring Food Security and Reliability for Communities?

School Name:
Carmel High School, Modankapu, Mangalore

India's food demand is projected to increase by more than 70% by 2050 due to population growth and rapid urbanisation. Traditional farming methods are struggling to meet this demand without depleting natural resources or harming the environment through excessive use of water, soil and chemical fertilisers. To address these challenges, students at Carmel High School applied the NXplorers methodology to analyse food scarcity, identify key leverage points and explore sustainable solutions. Using NXplorers tools such as the Feasibility Funnel and Ripple Effect Diagram, they developed an innovative model called

Hy Aqua Harvest. Hy Aqua Harvest combines aquaculture with small-scale plant farming, where fish waste provides nutrients for plants while the plants purify water for the fish, forming a self-sustaining cycle. The model is cost-effective, simple to maintain and suitable for households and communities. Through this project, students promote sustainable water use, responsible consumption and circular food production.

The project won second prize, with a cash award of Rs 3,000, in the Food and Nutrition category at the Muller Medi Expo, held at the Father Muller Convention Centre, Mangalore, on 13 and 14 October 2023.

> " A drop Harvested is A Crop Harvested "

Solution

Hy Aqua Harvest links fish farming with plant cultivation to create a balanced, self-sustaining ecosystem. Fish produce nutrient-rich waste, which is circulated to plants as natural fertiliser. Plants absorb nutrients, grow healthy and purify water, which is returned to the fish tank. This cycle reduces water consumption, eliminates the use of chemical fertilisers, and maximises resource efficiency.

The system is designed for simplicity and practicality. It can be built using basic materials and does not require advanced skills or equipment. Fish tanks and plant beds can be set up in homes, schools or community spaces. Maintenance is easy, and components can be dismantled or relocated. Hy Aqua Harvest encourages sustainable food production, teaches resource management and promotes eco-friendly practices. Integrating aquaculture with farming provides a replicable solution that can help communities meet rising food demand while protecting natural resources.

Conclusion

Hy Aqua Harvest offers a practical, eco-friendly approach to meeting India's rising food demand. By connecting fish farming and plant cultivation, it creates a natural cycle that saves water, reduces chemical use and ensures efficient resource utilisation. The system is simple and accessible, allowing students, households and communities to adopt it without advanced skills or costly equipment. Hy Aqua Harvest demonstrates how small, innovative steps can bring significant improvements in sustainable food production. It inspires communities to rethink farming practices, encourages responsible resource use and builds readiness to address future food challenges in India.

Petrol Scammer

How Can We Manage the Misuse of Electricity in Urban Households to Ensure Reliable and Sustainable Energy Access for All Residents?

India faces an alarming rise in fuel misuse and energy waste, resulting in an annual loss of nearly Rs. 15,000 crore from petrol adulteration and inaccurate meter readings. With rapid urbanisation and growing transport demand, monitoring energy consumption has become a pressing challenge. These issues not only cause financial losses but also contribute to increased emissions and depletion of non-renewable resources.

Students from Pandiyakula Kshatriya Nadars (PKN) Girls Higher Secondary School, Thirumangalam, participated in the Shell NXplorers program to address this issue. Using Shell NXplorers tools like the Connections Circle and Feasibility Funnel, they analysed the causes of petrol misuse, identified human- and system-level gaps, and thereby explored potential interventions. The students conceptualised an idea called Petrol Scammer, a digital energy-monitoring system designed to detect and prevent fuel fraud. Their approach promotes responsible energy use, transparency in transactions, and supports reliability. This initiative aims to raise awareness about energy consumption and encourages society towards smart, accountable resource management.

> " Fuel the Future with Smart Monitoring "

School Name:
PKN Girls Higher Secondary School, Thirumangalam, Madurai
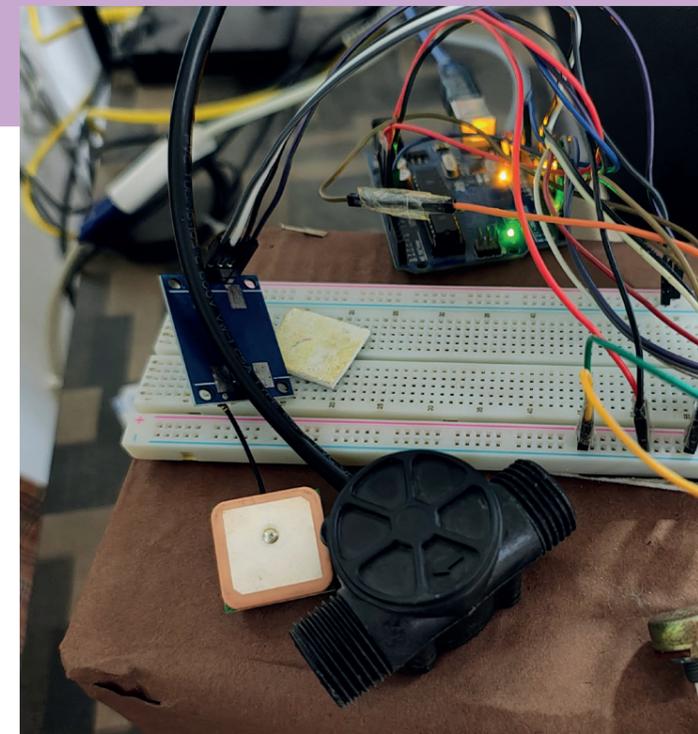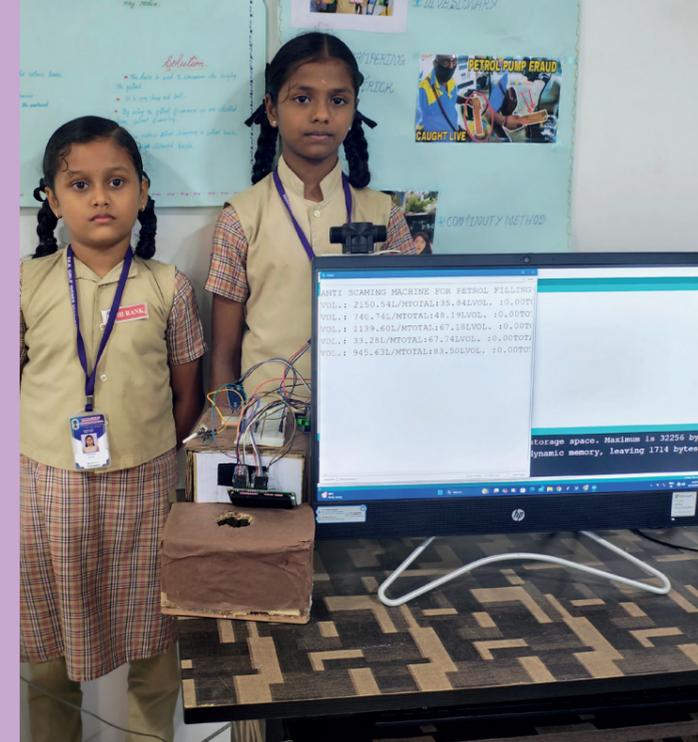
Solution

The Petrol Scammer is an intelligent fuel-monitoring system designed to detect fraud and promote efficient energy use in India. It uses IoT-enabled smart sensors and digital tracking to record fuel dispensing in real-time. Any difference between actual and recorded output triggers an alert, helping consumers and authorities identify tampering or misuse instantly. The system also generates audit reports, ensuring transparency and accountability across petrol stations.

This model reduces human error, prevents meter manipulation and supports better regulatory compliance. It is affordable, scalable and suitable for both urban and rural setups. The students plan to add future features, including mobile app integration for live fuel data, AI-based anomaly detection, GPS-enabled tanker tracking, and cloud storage for central monitoring. These add-ons will improve data accuracy and enhance oversight for government and fuel companies. Through Petrol Scammer, the students aim to build a transparent, trustworthy energy management system for India's growing energy sector.

Conclusion

The Petrol Scammer project highlights how technology can address the critical issue of fuel misuse in India. By integrating smart sensors and real-time tracking, it ensures transparency, prevents fraud and promotes efficient energy use. The solution not only saves fuel and reduces economic losses but also strengthens consumer trust and environmental responsibility. Its affordability and scalability make it ideal for widespread adoption across cities and rural areas. The students' innovative thinking displays the power of youth-led initiatives in driving sustainable change. Through Petrol Scammer, they envision a future where energy is consumed ethically, efficiently and responsibly.

Unavu App

How Can We Manage Food Waste in Households and Community Events to Prevent Hunger and Improve Resource Utilisation?

School Name:
Government High School, Kandigai, Chennai

India wastes nearly 68 million tonnes of food every year, even as over 190 million people go hungry daily, according to the United Nations Environment Programme. Massive quantities of cooked food and vegetables are discarded at weddings, events and households. Despite being edible, much of this surplus food ends up in landfills because there is no organised redistribution system. Meanwhile, many underprivileged individuals struggle to secure even one nutritious meal a day.

Students from Government Higher Secondary School, Kandigai, Chennai Rural, attended the NXplorers program, observed the issue of food waste, and used tools like the Connections Circle and Ripple Effect Diagram to study its causes and impacts. They found gaps in awareness, communication and logistics between donors and receivers, which hindered food redistribution. This imbalance leads to resource wastage, economic losses and social inequality while contributing to 8 to 10% of global greenhouse gas emissions. To overcome this, they envisioned a technology-driven, transparent and scalable system that ensures efficient food sharing and supports a hunger-free community.

> " Share the Spare, Show You Care. "

Solution

The Unavu App is a smart digital platform that connects food donors with receivers in real time. Donors such as restaurants, event organisers, and households can list surplus food with details such as quantity, type, and pickup location. Registered receivers can instantly view nearby listings and collect the food before it spoils. The app features real-time notifications, verification systems and GPS tracking to ensure safety, accountability, and minimal wastage.

The system is simple to use, community-driven and environmentally beneficial. It reduces landfill waste, lowers methane emissions and supports responsible food consumption. Future add-ons include AI-based freshness prediction, integration with cold chain partners, voice-enabled accessibility for rural users, and data dashboards for NGOs and local bodies to plan food distribution more effectively. The students designed Unavu using NXplorers' methodology to build an ethical and scalable model aligned with India's vision for zero hunger and sustainable living, making it a practical step toward responsible resource utilisation.

Conclusion

The Unavu App presents an innovative way to tackle India's twin challenges of food wastage and hunger. By connecting donors and receivers through a transparent and real-time platform, it ensures edible food reaches those who need it most. The solution encourages community participation, reduces environmental pollution from decomposing food, and promotes responsible consumption. It aligns closely with SDG 2 and SDG 12, reinforcing India's commitment to sustainability and equity. The project demonstrates how youth-led innovation can transform social challenges into opportunities for compassion, efficiency, and collective progress toward a more inclusive and sustainable future.

Jaadu Ki Goli

How Can We Effectively Prevent Food Spoilage During Storage and Transportation Using Affordable and Environmentally Sustainable Methods That Benefit Farmers, Vendors and Consumers?

School Name:
Shiravane Vidyalaya and Junior College, Nerul, Navi Mumbai

India loses nearly 10-15% of its harvested food each year, amounting to over Rs. 92,000 crore. These losses, caused mainly by poor storage, humidity, pests and microbial spoilage, directly affect farmer incomes, consumer prices and national food security. Despite being one of the world's largest producers of food, India ranked 111th in the Global Hunger Index 2023, showing an apparent mismatch between production and availability.

Many storage methods rely on chemical preservatives, which may extend shelf life but reduce food quality and harm human health. Rural communities face the added challenge of limited access to sustainable storage solutions, leading to further waste.

Through the Shell NXplorers program, students at Shiravane Vidyalaya explored this issue using NXthinking tools like the Connections Circle and Ripple Effect Diagram to identify key causes and their impacts. Their insights led to the creation of an eco-friendly preservation method called Jaadu Ki Goli, designed to naturally protect stored food and promote responsible consumption.

> **"** Jaadu Ki Goli – Natural Protection for Every Grain **"**

Solution

Jaadu Ki Goli offers an eco-friendly, chemical-free solution for food preservation. Each pellet is made from a blend of natural ingredients, including turmeric, neem, cloves, cinnamon, bay leaf, chirayat, and garlic peel, known for their antimicrobial and antifungal properties. The preparation involves drying, grinding, and blending these materials with ash and water to form small balls that are sun-dried for long-lasting use. When placed with grains or pulses, they absorb excess moisture, repel insects and prevent microbial spoilage.

The solution is affordable, easy to make, and safe for all users, ensuring that food retains its natural quality without toxic residues. Jaadu Ki Goli can be effectively used in households, local shops and warehouses. In the future, this innovation can be upgraded into sachet or powder forms for easier packaging and large-scale distribution, along with digital awareness campaigns to educate rural communities about natural food preservation techniques.

Conclusion

Jaadu Ki Goli reflects the spirit of reliable innovation rooted in Indian tradition. Using locally available materials is a cost-effective way to naturally preserve food without relying on harmful chemicals. This initiative supports farmers and families by reducing storage losses, improving food quality and strengthening food security.

Through the Shell NXplorers program, students demonstrated how creative thinking and scientific understanding can lead to practical, eco-friendly solutions for real-life challenges. Their work inspires communities to value traditional knowledge and adapt it with modern perspectives for a healthier, reliable and waste-free future.

Nirmal Jyothi

How Can We Ensure Reliable and Affordable Access to Clean Energy for Rural Households and Communities in India to Support Development and Quality Living?

India's rural regions continue to face severe energy shortages, with around 20 million households still lacking reliable access to electricity. At the same time, air pollution from traditional biomass and coal-based stoves contributes to over 600,000 premature deaths annually. The widespread use of flue gas chimneys in villages, though necessary for cooking and heating, releases significant amounts of harmful gases such as carbon monoxide and sulphur oxides. This not only pollutes the environment but also wastes heat energy that could otherwise be converted into useful power.

The students at Madhava Kripa English Nursery and Higher Primary School, after participating in the NXplorers program, studied this issue using tools such as the Connection Circle to understand interlinked key factors and the Feasibility Funnel to identify sustainable solutions. They realised that waste heat from chimneys —an unused yet abundant resource —could be harnessed to produce clean energy while minimising harmful emissions. Their project, Nirmal Jyothi, was designed at their ATL lab at the school, aiming to create a sustainable rural energy model that reduces pollution, improves public health, and ensures affordable access to electricity for all.

"Smoke to Spark – Powering Villages, Protecting Lives."

School Name:
Madhava Kripa English Nursery and Higher Primary School, Ananth Nagar, Manipal

Solution

The Nirmal Jyothi system transforms waste heat from traditional flue gas chimneys into usable electricity while controlling air pollution. The chimney surface is painted black to absorb as much heat as possible and wrapped in a fluid jacket filled with ethylene glycol. This heated fluid transfers energy to thermoelectric generator (TEG) modules that convert the temperature difference into electricity using the Seebeck effect. The generated power is regulated through a voltage stabiliser and stored in rechargeable batteries for household lighting and small appliances.

To reduce pollution, the model includes a dual-filtration system. The first layer traps ash and soot, while the second layer of activated charcoal removes harmful gases such as sulphur dioxide and nitrogen oxides. The system is cost-effective, easy to maintain and adaptable for rural households. In the future, solar-assisted heating and IoT-based temperature monitoring can enhance efficiency. Nirmal Jyothi offers an innovative, sustainable way to convert smoke into light and pollution into progress.

Conclusion

Nirmal Jyothi stands as a strong example of how simple ideas can bring meaningful change to rural India. By using waste heat from chimneys to generate electricity, the model ensures a steady power supply for homes while reducing harmful emissions. It supports clean energy goals and promotes better health by improving air quality. The system is affordable, easy to maintain, and suitable for village households. Through the NXplorers approach, students have shown how science and innovation can work together to solve local problems. Nirmal Jyothi brings light and hope to rural communities.

Smart Reminder for Corporation Water

How Can We Ensure Timely and Efficient Access to Corporation Water in Urban Areas to Reduce Wastage and Promote Sustainable Water Use?

India faces a severe water crisis, with more than 600 million people experiencing high to extreme water stress. In cities, nearly 35-40% of supplied water is lost due to leakage, poor distribution, and ineffective planning. Residents in urban and semi-urban areas depend heavily on the corporation's water supply, but the timing, frequency and duration of water delivery remain uncertain.

Without timely updates, households are unable to prepare storage containers, resulting in unnecessary waste. Supply information is often shared through word of mouth or irregular announcements that fail to reach every family—this lack of real-time communication results in inefficient water management.

After attending the Shell NXplorers workshop, students of Government Girls Higher Secondary School, Poonamallee, identified awareness and timely communication as crucial for efficient water use. Using NXplorers tools, such as the Consequence Circle, they explored broader outcomes, including reduced household stress, improved conservation, and enhanced citizen-government collaboration. The idea won third prize at the Grand Finale of Innova TN 2024, a prestigious state-level ATL Innovation Challenge organised by Atal Innovation Mission, NITI Aayog.

School Name:
Government Girls Higher Secondary School, Poonamallee, Karayanchavadi, Chennai

" Smart Reminders for Smarter Living, Connecting Communities with Every Drop "
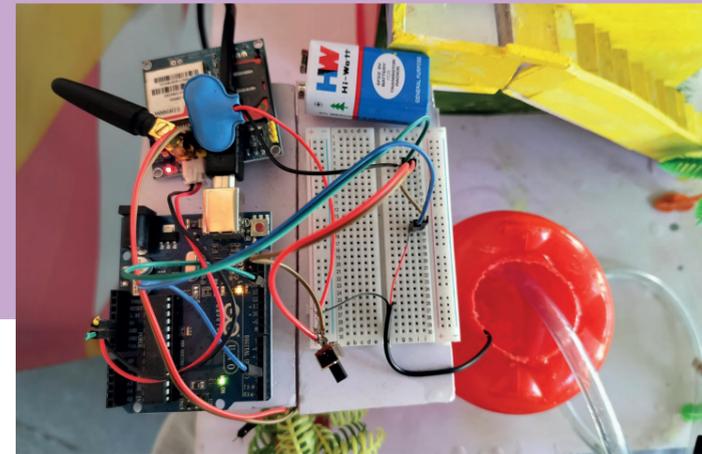
Solution

The "Smart Reminder for Corporation Water" project provides an automated SMS alert system that notifies citizens about water supply in real time. The system uses an Arduino microcontroller, a GSM module, and a water flow sensor, all connected via a simple electronic circuit. When water begins to flow through the municipal pipelines, the flow sensor detects it and immediately sends a signal to the microcontroller. The microcontroller processes this signal and triggers SMS alerts to all registered residents in the locality via the GSM module.

This enables households to prepare storage containers in advance, preventing waste and ensuring uninterrupted water availability. The system reduces unnecessary complaints to water authorities and enhances trust in municipal services.

The solution is flexible, cost-effective and can be scaled for deployment across cities and towns in India. Future upgrades could include mobile applications with visual dashboards, AI-based predictive alerts, and integration with smart home devices to improve further water conservation and planning, and ensure urban water management.

Conclusion

The "Smart Reminder for Corporation Water" project empowers citizens to use water responsibly through real-time alerts, bridging gaps between water authorities and households. Providing accurate information reduces waste, enhances preparedness, and strengthens trust in public utilities. The initiative also improves community well-being and encourages sustainable urban water practices. Scalable across cities, the system promotes awareness, conservation and participatory governance. Through this project, students demonstrated that simple technological interventions, combined with community engagement, can effectively address urban water challenges. By embracing such solutions, India can move towards a future where every drop is valued and water scarcity is systematically managed.

Sivaranjani's Smart Solution for Water Management

At Government Girls Higher Secondary School, Poonamallee, Tiruvallur, Chennai Metropolitan Area (CMA), Tamil Nadu, a spark of innovation was quietly transforming the way students approached real-world challenges. Ms Sivaranjani turned a simple observation about irregular water supply into an innovative solution. With the guidance of her NXplorers facilitator and the resources of the school's ATL Lab, she developed "Smart Reminder for Corporation Water", an SMS notification system to alert residents about water supply schedules, helping households plan ahead and reduce wastage.

Her project gained state-wide recognition at Innova TN 2024, the 2nd State-Level ATL Innovation Challenge for Tamil Nadu and Puducherry. Out of 517 nominations, only 124 projects reached the final round at Erode Sengunthar Engineering College, Tiruchengode. Sivaranjani's work impressed the judges, earning third prize and a cash award of Rs.10,000. The award highlighted both her technical ingenuity and the real-world impact of her solution. Beyond the recognition, her work was celebrated for its tangible social impact and innovative approach to a pressing problem.

Sivaranjani's journey didn't end there. She, along with twenty other top teams, advanced to the Student Innovator Program (SIP) of ATL, a platform to refine their innovations and take them closer to real-world application. Her story is a shining example of how ATL Labs nurture young minds—turning curiosity into action, ideas into solutions, and students into changemakers.

From Classroom Curiosity to National Recognition: The Story of Pranjal Bhilare

Every great idea begins with a question. For Pranjal Bhilare, a Grade 10 student from Modern School, Vashi, Maharashtra, that question was simple yet powerful: Can we create a product that benefits both people and the planet? From this spark of curiosity emerged a remarkable innovation that is reshaping conversations around women's health and sustainability.

As an Atal Tinkering Lab (ATL) school, Modern School provides students with a vibrant space for curiosity, experimentation, and hands-on innovation. It was in this dynamic lab that Pranjal's idea took shape. During the Shell NXplorers program, implemented by Learning Links Foundation, she was encouraged to approach global challenges through science, technology, and innovative thinking. Observing the environmental hazards of conventional sanitary products, Pranjal set out to find a sustainable solution. With mentorship, collaboration, and hands-on experimentation, she developed Agricare Comfort—a 100% biodegradable sanitary napkin made from banana pseudo-stem fiber. Her innovation not only promotes menstrual hygiene but also reduces non-biodegradable waste.

Pranjal's innovation earned national recognition at the Social Impact Awards (SIA) 2025, where she stood out among 312 entries as one of the Top 21 finalists. Through the SIA incubation program, she refined her prototype, strengthened her entrepreneurial mindset, and explored ways to scale her impact.

As the only school student among startup finalists, she presented her idea at the SIA Ceremony in Impact Hub Hyderabad on 8th October 2025, impressing the jury with her poise, clarity, and purpose-driven approach. Pranjal's journey exemplifies how curiosity, guidance, and opportunity can inspire young innovators to create meaningful and lasting change.

"Through NXplorers, I realized that even a small idea can grow into a solution with the power to change lives. My dream is to make sustainable menstrual products accessible to every girl and woman, while protecting the environment we all share."

Young Innovators Making Waves

A. Passive Energy from EV Vehicle

B. Bio Bloom Investigator 2.0

A. Passive Energy from EV Vehicle

At Changemakers of Tomorrow(CME) 2025, three students from P.A. Chinniah Raja Memorial Higher Secondary School—Sanjith P., Muthu Ragavan M., and Ganesh Kumar M., from the small town of Rajapalayam, Virudhunagar, Tamil Nadu had captivated both judges and audience with their groundbreaking innovation. Guided by their ATL Coordinator and leveraging the resources of their Atal Tinkering Lab, they developed "Passive Energy from EV Vehicle", a prototype that generates energy from moving vehicles, offering a practical and innovative approach to energy generation in EVs.

On the stage of the Pitch for Change Competition at CME 2025, the team presented their project with clarity, confidence, and poise, impressing the jury with their creativity, teamwork, and problem-solving

skills. Their victory was a proud moment for the school and demonstrated how combining the NXplorers methodology with the advanced resources of ATL labs can empower young minds to transform ideas into impactful, real-world solutions.

B. Bio Bloom Investigator 2.0

Ms. Pranjal Bilare and Ms. Anushka Panchal from Modern School, Vashi, turned innovation into impact. mentored by the NXplorers program and utilising the Atal Tinkering Lab at their school, they created Bio Bloom Investigator 2.0, a semi-autonomous robot that monitors water bodies, detects and removes harmful algal blooms, while preserving non-harmful algae.

Their project won the NX Student Pitches competition at Changemakers of Tomorrow 2024, earning the school an NXplorers Centre of Excellence Lab. This success showcases how ATL Labs' hands-on resources and mentorship empower students to develop sustainable solutions for real-world challenges.

News Articles

मुंबईमध्ये शेल एनएक्सप्लोरर एटीएल सायन्स कार्निव्हल 2024

नवराष्ट्र
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जागतिक स्तरावर राबवला उपक्रम ● ऊर्जा शाश्वततेशी संबंधित समस्यांवर उपाय
शिक्षकांसाठी शेल एनएक्सप्लोरर्स

सशक्त शिक्षक घडवण्यासाठी लर्निंग लिंक्स फाऊंडेशनचा पुढाकार

शेल एनएक्सप्लोरर्सच्या कार्यशाळेद्वारे नवी पिढी घडविण्याचा प्रयत्न

லார்னிங் லிங்க்ஸ் ஃபவுண்டேஷனின் நெக்ஸ்ப்ளோரார்ஸ் ஆசிரியர்களுக்கான தொழில்முறை மேம்பாட்டுத் திட்டம்

Modern School's marine life project earns acclaim at Bangalore's Global event

पुण्य नगरी
पचवी जाधव विद्यार्थ्यांच्या विद्यार्थीं परकलाचा द्वितीय कमाक

Sustainable Future with Energy Clubs

An Energy Club is a student-led initiative under the Shell NXplorers program, guided by ATL Coordinators within the Teacher Support Model at the ATL schools. The Energy Club promotes sustainability by empowering students with the knowledge, skills and leadership to address local environmental challenges through innovation. The initiative aims to nurture environmentally conscious young leaders who are committed to building a greener future.

The Energy club aims to develop student leadership by involving them in environmental projects and decision-making. The initiative also seeks to position ATL schools, Atal Innovation Mission, NITI Aayog as model institutions for sustainability within the ATL ecosystem. The Energy Club encourages environmental responsibility by raising awareness about sustainable practices related to food, water and energy; and by engaging the community through cleanliness drives and awareness campaigns. Ultimately, the Energy Club strives to create a long-term impact by equipping students with the skills, knowledge and passion to continue driving positive change beyond their time in the club.

Making Paper Bags

Students preparing Paper Bags

Minirose Public English Medium School, Gulbarga

Cleanliness Drive and Awareness Campaign

Students take part in a beach cleaning drive

St. Lawrence High School, Mumbai City

Bio Diversity Mapping

Teacher guiding students on how to do biodiversity mapping

Kitturu Rani Chennamma Residential School, Hukkeri

Adopt a Plant

Teacher guiding students during the plant adoption activity

Imamwada Municipal Secondary School, Mumbai City

NXplorers Carnival

NXplorers Media Highlights

Belguam

Mumbai

Virudhnagar

Voices of Impact | From Government Officials

On behalf of DIET Dakshina Kannada, I would like to express our heartfelt gratitude to Shell NXplorers, in collaboration with Atal Innovation Mission (AIM) NITI Aayog and Learning Links Foundation for your exceptional efforts in bringing the Shell NXplorers Teacher Professional Development Program to our rural and low-income ATL schools. Your dedication to empowering teachers and students with innovative, hands-on learning experiences has created a profound impact on our education system.

The teacher trainings conducted by the LLF team, followed by the seamless school-level implementation of these trainings through our ATL schools, have ignited a remarkable wave of curiosity, creativity and enthusiasm among both educators and students. It is truly inspiring to witness teachers confidently facilitating sessions and guiding students as they tackle real-world challenges. The enthusiasm and engagement displayed by the students, as they develop innovative solutions, is a testament to the effectiveness of this NXplorers program.

This initiative has transformed the learning culture in our ATL schools by fostering critical thinking, problem-solving and innovation among students. We are delighted to see students applying their knowledge to develop practical solutions that not only enhance their learning but also contribute positively to their communities.

— Principal DIET & Ex-Officio, D.D.P.I. (Dev.), Mangaluru, Karnataka

Here in Thoothukudi district our Learning Links Foundation gives training in various aspects of science both for teachers as well as students. I also participated in the training for teachers Professional Development Program related to Shell NXplorers which is in collaboration with Atal Innovation Mission, NITI Aayog on 20.02.2025. The Shell NXplorers Program has topics which are really very good and surely it will increase the scientific knowledge and critical thinking among the students. I request the implementation partner Learning Links Foundation to conduct such programs everywhere in order to improve the scientific knowledge, problem solving and 21st century skills among the students, not just in Thoothukudi Dist TamilNadu, but all over India. Good initiative and good efforts for science would lead to a great nation.

— D. Chidambaranathan, District Educational Officer, Private Schools, Thoothukudi, Tamil Nadu

We extend our heartfelt gratitude for your efforts in bringing the Shell NXplorers Teacher Professional Development Program to ATL schools in urban and rural Yadgir, Karnataka. Your commitment to fostering critical thinking, problem-solving and innovation seeks to provide students with critical thinking skills to develop practical solutions under the United Nations Sustainable Development Goals (SDGs),

The Science Carnival organized by LLF in collaboration with Shell was equally commendable. This well-organized event provided a platform for ATL school students to showcase their creativity and skills. The increasing number of projects displayed at school science fairs, especially on Science Day, is a testament to the enthusiasm being shown for STEM learning and sustainability-driven innovation.

We look forward to strengthening this valuable partnership and witnessing the continued positive impact of your initiatives. Thank you for your unwavering dedication and contributions!

— Deputy Director (Development & Principal), District Education and Training Institute (DET), Yadgir District, Karnataka

I am writing to express my heartfelt appreciation and admiration for the remarkable execution of the Shell NXplorers programme in ATL lab-equipped schools during this academic year. It was truly a pleasure and honour to be the Chief Guest for your TOT event. Despite the short notice, your team's dedication, coordination and meticulous planning ensured the seamless implementation and completion of this transformative Shell NXplorers program. It is evident that the students were deeply enthusiastic about the workshops, showcasing their eagerness to learn and engage. Their excitement and participation reflect the immense impact of your efforts.

While I was unable to personally visit the workshops, the feedback we received from schools and participants was overwhelmingly positive and delightful. The Shell NXplorers programme in collaboration with Atal Innovation Mission, NITI Aayog implemented by the Learning Links Foundation has undoubtedly set a benchmark for fostering creativity and innovation among young minds. We are looking forward to collaborating with you further and exploring new opportunities to drive meaningful initiatives for the betterment of our students and communities. Wishing you continued success in all your endeavours.

— Mrs.P. Kanagarani, DEO Secondary, Department of School Education, Ramanathapuram, Tamil Nadu

Voices of Impact | From School Authorities

The Shell NXplorers programme has elevated the pedagogical approach at our school by establishing a strong framework that enhances scientific thinking and complex problem solving among students. Through effective implementation, ATL students have moved beyond rote learning and now engage in identifying real world problems and developing innovative change projects. They apply core scientific principles and structured methodologies to design and execute viable solutions, fostering ownership and technical capability. This sustained engagement builds essential 21st century skills such as critical analysis, logical reasoning and meaningful collaboration.

Continuous guidance and consistent support throughout the programme helped students understand sustainable development and apply it thoughtfully in their NXplorers change projects. This mentorship enabled high quality change projects, participation in competitions and active contributions to the Energy Club. Overall, the programme excels.

— Principal, Symbiosis Convent High School, Kausa, Mumbra, Thane, Mumbai Metropolitan Region, Maharashtra

The Shell NXplorers programme has played a significant role in reshaping how our students think, learn and respond to real world challenges. Through structured capacity building of ATL coordinators and students, the NXplorers methodology strengthened the students' analytical thinking, problem exploration and collaborative working practices. Students' progressed from passive learning to confidently applying concepts in the design of practical and innovative solutions.

The program's strong alignment with the Sustainable Development Goals, delivered through engaging and well-designed workshops, helped students develop a broader global outlook and a clearer sense of responsibility. Continuous mentoring supported the development of impactful NXplorers change projects and improved execution quality. Our school's selection for Energy Club activities in the Virudhunagar and Madurai region of TamilNadu stands as recognition of this growth. Overall, the programme has built resilience, creativity and a future ready mindset among our learners.

— Principal, Sri Ramana Vidyalaya Montessori Matric Hr. Sec School, Rajapalayam, Virudhunagar District, Tamil Nadu

A joint workshop of Shell NXplorers in collaboration with Atal Innovation Mission, NITI Aayog implemented by Learning Links Foundation for the students of class 6th to 7th in our ATL school helped to develop their creative thinking skills and inspire the students to come up with new ideas on sustainable development, creative thinking and problem solving approach.

We would like to express our gratitude for the hard work your team put into this workshop and would definitely love to participate in such initiatives and work with your team in the future to solve real-world problems of the society. Thank you very much for the wonderful workshop conducted by you and I am grateful to you for your commitment.

— Principal, St. Xavier's High School, Gevrai Survey No. 65, Tak Gaon Road, Gevrai-431127, Dist. Beed, Maharashtra

We would like to express our sincere gratitude to Morarji Desai Residential School, Savaleshwar, Dr. Alanda, G. Kalaburagi, for giving us the opportunity to participate in the Shell NXplorers program in collaboration with Atal Innovation Mission, NITI Aayog. This program was a very valuable experience for all sections of our school community, including students, teachers and the school administration.

The NXplorers program had a transformative impact on our students. Many had never participated in a structured innovation program before and the workshops, interactive real-world experiences and project-based learning methods taught students to think critically, analyze real-life problems and be responsible for sustainable development through innovation.

It is truly remarkable how the program introduces key areas such as food, water and energy in a very accessible and challenging way. These principles are aligned with the Sustainable Development Goals (SDGs) and are designed to be understandable to school students. We look forward to participating in the Shell NXplorers program and other collaborations in the future. We are continuously working on such impactful initiatives.We assure you of the spirit and enthusiasm of participation.

— Principal, Govt. Morarji Desai Residential School, Savaleshwar (SC-506) Tq Aland Dist. Kalaburagi, Karnataka

We are grateful for organizing the Shell NXplorers workshop in our ATL school. The sessions were led by our ATL teachers and supported by the experienced LLF Facilitators. These sessions have had a profound impact on our students, enhancing their creative thinking, problem-solving skills and innovative mindset. Focusing on the key areas of development – food, water and energy – the programme has inspired students to critically analyse global challenges and develop practical, innovative solutions. NXplorers has truly empowered them to become active changemakers, contributing to a more sustainable and resilient future. We are deeply grateful for this invaluable learning experience and look forward to continuing our collaboration with NXplorers to empower young innovators.

— Head Master, Balika Adarsh Vidyalaya Tilakwadi, Belgaum, Karnataka

Voices of Impact | From Students

We learned many valuable concepts in the NXplorers workshop. During the session we explored the five NXthinking elements which include Big Picture, Connections, Perspectives, Future and Change. We also understood the three stages of the NXplorers process: Explore, Create and Change. These concepts were taught clearly and they helped us understand the problems faced by society. We now feel confident that we can analyse these issues and work towards practical solutions. We could also relate these learnings to the themes of food, water and energy. We will definitely work on a project based on these insights. All the activities were engaging because each one taught us meaningful lessons. Thank you.

— Raj, 8C, Sant Nirankari Senior Secondary School, Delhi

My name is Hafsa from Class 9 and I would like to share my experience of the NXplorers Senior Advanced workshop. This workshop helped me strengthen my thinking skills and creativity. The sessions included both practical activities and theory and the teachers explained each concept so clearly that even the difficult topics became easy to understand. We learned about the five parts of NXthinking and how to apply them to real-life problems. My entire class found the workshop very engaging. After attending it I feel more confident about my future and I believe I can work towards my goals with clarity. I am thankful to Shell NXplorers and to our trainer sir for providing this valuable learning experience. Thank you.

— Hafsa, P&T Senior Secondary School, Delhi, India

At first I thought the NXplorers workshop would be like a regular class but it turned out to be very different and interesting. On the first day the NXplorers facilitator explained what NXthinking is and how it helps us understand problems in a better way. I learned to look at the big picture, identify connections and think from different perspectives. We took part in activities based on real-life situations which helped me understand how food, water and energy are closely linked. I also learned about the 17 Sustainable Development Goals and how they relate to the challenges we see around us.

On the second day we focused on the Create and Change stages. The scenario planning activity helped me think about possible futures and the feasibility funnel helped me understand that not every idea can be implemented in the real world. The ripple effect tool showed how one action can lead to many other changes. I was also introduced to several new terms and concepts that were completely new to me. This workshop did more than share information, it changed the way I think. Thank you NXplorers.

— Ritika, 9th B, P&T Senior Secondary School, New Delhi

Before the NXplorers workshop I had never thought deeply about energy or how it influences our everyday life. Our NXplorers Facilitator made the sessions very engaging and I liked that we were encouraged to develop our own project ideas instead of only listening. The Cobra story and the ripple effect tool were my favourites because they showed how one small action can lead to a larger change. I also feel that I can apply these ideas in my daily life now. Thank you Shell NXplorers for giving me this opportunity.

— Chaitra, 8th C, Vishwakarma Vidyalaya, Pune, Maharashtra

The NXplorers methodology helped me understand how to break down problems step by step which made everything clearer. The facilitator guided us in a simple way and I realised the importance of looking at the big picture before deciding anything. The elephant story showed how different perspectives matter and that improved my critical thinking. I now feel more confident to work in teams, share my ideas and solve issues related to food, water and energy like a young problem solver.

— Om, 8th B, Vishwakarma Vidyalaya, Pune, Maharashtra

Voices of Impact | From Students

NXthinking introduced me to a complete way of structured problem solving. The activities helped me explore ideas in an organised manner and improved my communication skills. I used to hesitate to speak but after participating in discussions I feel more confident. The method encouraged me to think critically and innovate. I now see myself building a future in science because this approach showed me that students can create meaningful solutions.

— Prathmesh, 8th A, Vishwakarma Vidyalaya, Pune, Maharashtra

Earlier I never understood how problems are connected or how many ideas can be explored before choosing one. Through the NXplorers methodology I learnt to analyse issues from different perspectives and work together with my classmates. Our teamwork helped me communicate better and understand the value of collaboration. Applying this new way of thinking made complex topics feel simple and helped me look at food, water and energy challenges with more clarity and confidence.

— Santhosh, Grade 9, Om Shanti School, Ahmedabad, Gujarat

Learning NXthinking gave me a clear method to understand real-world problems. The activities helped me think creatively and communicate my ideas better. Our sir explained every tool in a way that built my confidence and pushed me to look for innovative solutions. I now understand why food, water and energy issues are so important and how students can play a role in addressing them. This program helped me grow in problem solving and teamwork.

— Taniya Tomar, 8A, Dayanand Model Senior Secondary School (For Girls), New Delhi

The NXplorers methodology showed me that every idea has potential if we think critically and plan properly. I learned to work in groups, listen to others and express my thoughts more clearly. The discussions improved my communication skills and made me more innovative in my approach to problems. Now I feel confident to explore issues connected to food, water and energy and contribute solutions that can create change.

— Akhil, Grade 7, Karnataka Public School, Uttarahalli, Bangalore, Karnataka

NXthinking encouraged me to explore problems deeply instead of settling for the first idea that came to mind. Tools like scenario planning and the connection circle helped me understand how issues are linked and how future outcomes can be imagined. Working with my classmates improved my collaboration and communication skills. This new mindset made me feel like a real innovator who can contribute solutions for food, water and energy challenges. I now feel excited to use these skills to create a better future.

— Sudheshna, Grade 9, Modern School, Vashi, Navi Mumbai, Maharashtra

Interview with ATL Coordinators

The ATL Coordinator from the Rajhans Vidyalaya, an ATL school in Mumbai rated the NXplorers program as well-structured and highly engaging, effectively promoting critical thought and collaboration among students. She confirmed the content's relevance, particularly noting the unique integration of real-world challenges and novel tools such as the Consequences Circle and Systems Thinking. The program yielded tangible results in student development, with a notable enhancement in their communication analytical and collaboration skills, enabling them t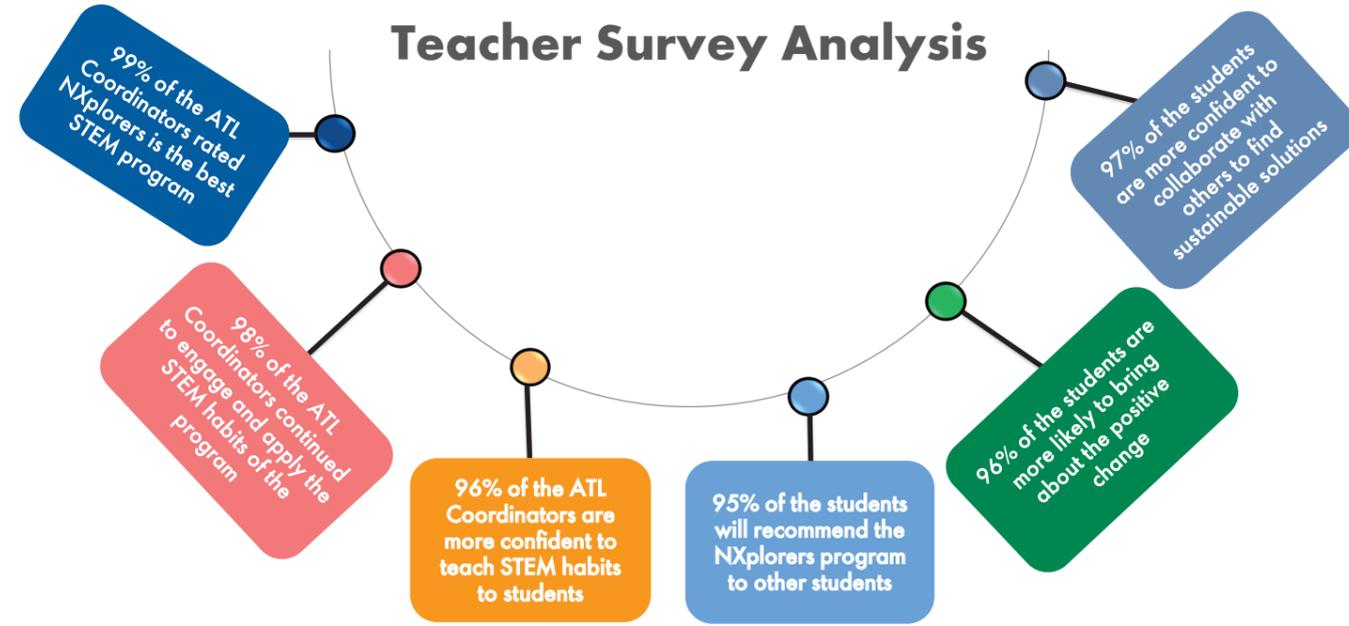o become confident presenters. Professionally, the ATL Coordinator has begun integrating the NXplorers' structured discussions and visual tools into her Computer and AI curriculum to facilitate deeper learning. She strongly believes the acquired life skills have transformed students into active problem solvers, preparing them exceptionally well for future academic and professional pursuits. The primary suggestion for improvement was to incorporate more project showcasing opportunities and practical activities in the final stages of the Juniors module.
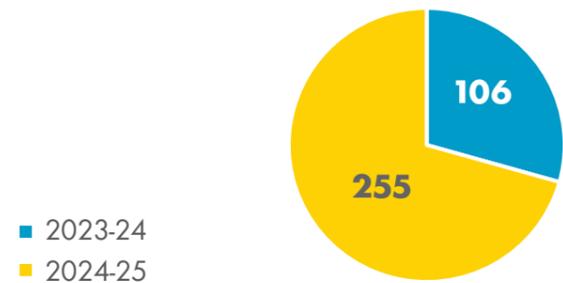
NXplorers in Action

Impact Assessment – KPIs
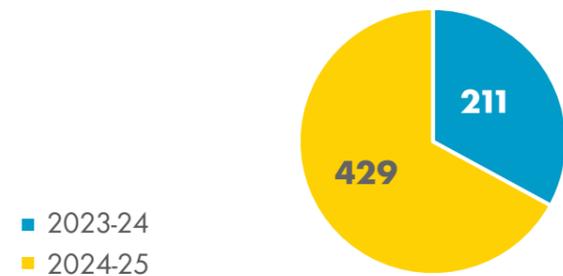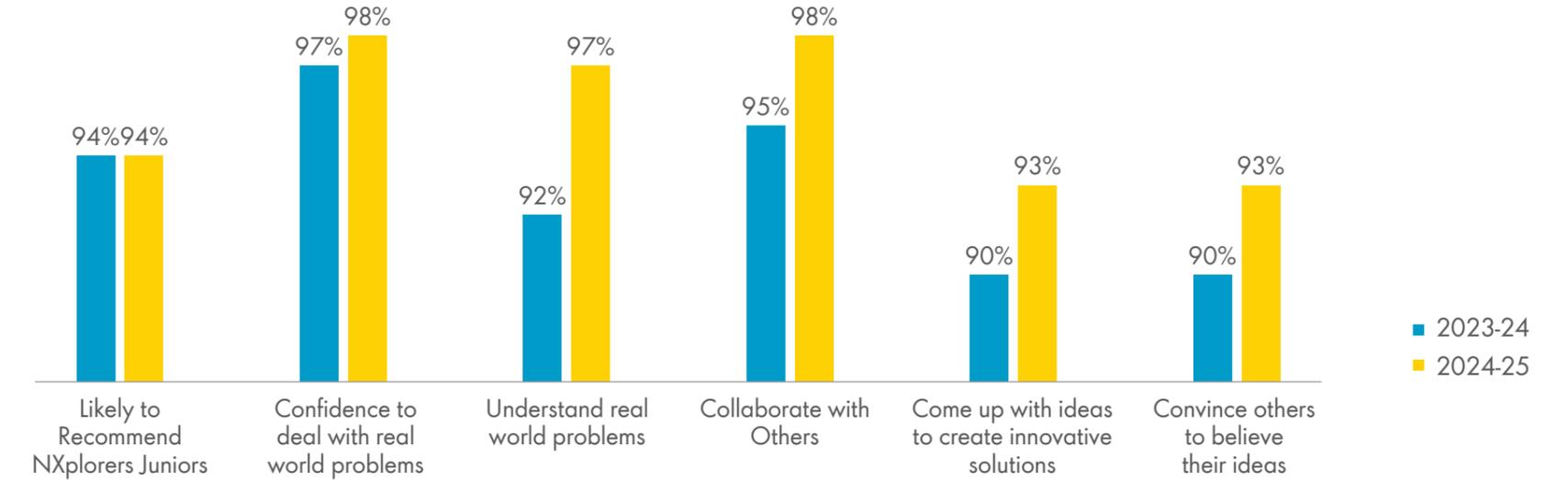
Teacher Survey Analysis

99% of the ATL Coordinators rated NXplorers is the best STEM program

98% of the ATL Coordinators continued to engage and apply the STEM habits of the program

96% of the ATL Coordinators are more confident to teach STEM habits to students

95% of the students will recommend the NXplorers program to other students

96% of the students are more likely to bring about the positive change

97% of the students are more confident with others to collaborate to find sustainable solutions

5

Total ATL Schools Covered

106
255

- 2023-24
- 2024-25

Total number of ATL Coordinators Trained

211
429

- 2023-24
- 2024-25

NXplorers Juniors Student Survey Analysis

	2023-24	2024-25
Likely to Recommend NXplorers Juniors	94%	94%
Confidence to deal with real world problems	97%	98%
Understand real world problems	92%	97%
Collaborate with Others	95%	98%
Come up with ideas to create innovative solutions	90%	93%
Convince others to believe their ideas	90%	93%

- 2023-24
- 2024-25

Total Student Beneficiaries

11,745
25,683

- 2023-24
- 2024-25
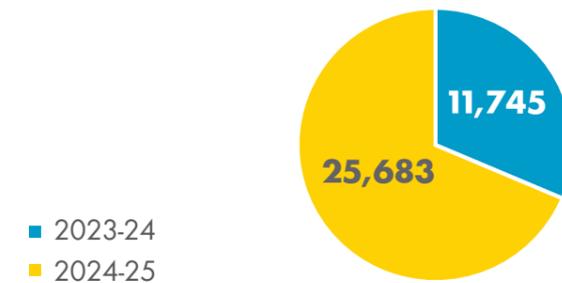
Percentage of Girl Student Beneficiaries
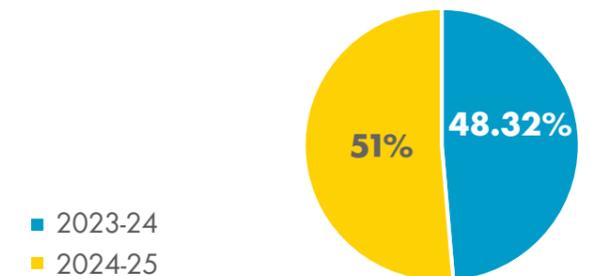
48.32%
51%

- 2023-24
- 2024-25

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