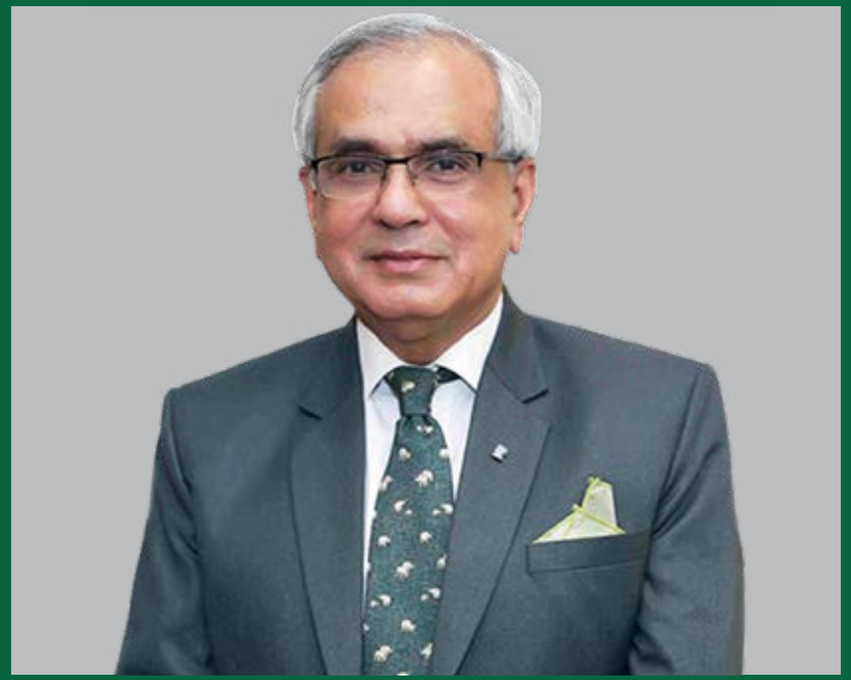
NITI Aayog | ATAL INNOVATION MISSION

The Ingenious 50

Celebrating Innovations of Atal Tinkering Lab (ATL) Innovation Marathon

> India is a youthful nation. Today's youngsters are becoming job creators
>
> **-Shri Narendra Modi**
> Hon'ble Prime Minister



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January 15, 2020

MESSAGE

India is making steady progress towards inculcating and nurturing a culture of innovation among its citizens. The growing diverse challenges of this ever-changing world require creative and innovative solutions for sustainable development and prosperity.

The Atal Innovation Mission (AIM), NITI Aayog is an excellent initiative by the Government of India to foster the spirit of innovation and entrepreneurship in the country with the Atal Tinkering Labs (ATL) program especially being one of a kind. In this era of Intelligence, sowing the seeds of innovation, the ATLs are revolutionizing education like never before with young student innovators coming up with very exciting ideas and prototypes.

I commend all the young innovators who have participated in the ATL Marathon 2018-19 and congratulate the Top 50 for coming up with innovative solutions and creating value, not only for the country but for the world. I hope that these stories which celebrate innovation, inspire and motivate other fellow citizens to embrace the spirit of innovation.

My best wishes to all ATL students, teachers and mentors and the AIM team for their energy and dedication in taking this Mission forward.

(Rajiv Kumar)

स्वच्छ भारत
एक कदम स्वच्छता की ओर

PROF. K. VIJAYRAGHAVAN
Principal Scientific Adviser
to the Govt. of India

के. विजयराघवन
भारत सरकार के प्रमुख वैज्ञानिक सलाहकार
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Message

India has a diverse ecosystem with different kinds of challenges which require new approaches, combining good management, design, science and technology in India's context as opposed to reverse engineering something that is available elsewhere. So we should view these extraordinary challenges as ways by which our science and technology can connect to new innovations. Today the time is right for our young innovators to articulate a vision for science and technology to take on the big challenges, which can actually transform the future of India.

There are 3 building blocks required for innovation and science and technology to reach to the citizens- Schools and academic institutions, the startup ecosystem and the industry where commercialization takes place, these 3 building blocks need to be connected and the Atal Innovation Mission has been successful in achieving the same.

At the school level the Atal Tinkering Labs (ATLs) are revolutionizing the education system like never before. Equipped with the latest technologies our young innovators are coming up with some very interesting concepts and disruptive prototypes bringing in a change in the scientific mindset of India.

It is wonderful to see all the students express their innovative spirit, and propose innovative solutions to India's community and social problems with ATL Marathon. I would like to congratulate the top 50 teams of the ATL Marathon 2018-19 for coming up with these thought provoking grass root innovations. These innovations are not only frugal but also provide new kind of approaches. These innovations will have an immense value for markets in India. I am sure that the stories in The Ingenious 50 will create a long-term impact and motivate, inspire other fellow students.

I commend the efforts of all the ATL students, mentors, teachers and the AIM team. These path-breaking innovations are a representation of all of their collaborative efforts. My best wishes to everyone contributing to this national movement.

K. Vijayraghavan

(K. VijayRaghavan)

Place : New Delhi
Dated : 22nd January, 2020

SHRI AMITABH KANT

Chief Executive Office, NITI Aayog

अमिताभ कांत
Amitabh Kant
मुख्य कार्यकारी अधिकारी
Chief Executive Officer

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Message

My heart is full of optimism and pride, as I witness the promising innovations by the young pioneers from Atal Tinkering Labs located in different corners of this country. These innovators make me wonder what the young children of this nation can achieve when given the opportunity to think unconventionally in order to challenge social norms and address issues that matter to them and their community. These students are the torchbearers of disruption in social and cultural norms in their respective areas. And together, they are creating the disruptive movement of transforming India towards becoming a global superpower.

These young leaders participated in ATL Marathon by Atal Innovation Mission which invited budding innovators from schools to address a problem aligned with the Sustainable Development Goals. Each participating student leveraged 21st century skills and ground breaking technologies available in their Atal Tinkering Lab to devise a solution. These young tinkerers took it upon themselves to identify their problem statements by interacting with the members of their community and designing a prototype in a manner that fits their needs and demands. I take pride in sharing that AIM team has identified the Top 50 innovations from 36 districts with equal gender ratio.

AIM has relentlessly worked to nurture these 50 teams with the Student Innovation Program, national and international showcase opportunities. The Ingenious 50 book is a compilation of best grassroot stories narrated by the students themselves, who have developed an agency for innovation and entrepreneurship at a young age. This is indeed an indication that the Atal Tinkering Labs program has become a key initiative toward the 'Tinkering' movement.

(Amitabh Kant)

Place- New Delhi
Dated- January 22, 2020

R. RAMANAN
Mission Director, Atal Innovation Mission, NITI Aayog

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मिशन निदेशक, अटल इनोवेशन मिशन
अतिरिक्त सचिव, नीति आयोग
भारत सरकार
संसद मार्ग, नई दिल्ली
Mission Director, Atal Innovation Mission
Additional Secretary, NITI Aayog
Government of India
Sansad Marg, New Delhi

Foreword

The success of Atal Innovation Mission initiatives will be eventually measured by its outcomes and impact on creating, promoting and sparking a spirit of innovation and entrepreneurship across the length and breadth of our country, starting with the young students in schools, universities to the professionals, researchers and startups in our industry.

The dedication and hard work of the people associated with AIM, be it our Atal Tinkering lab young innovators or our young entrepreneurs, the mentors of change and ATL in-charges including the AIM team - every small effort of theirs goes toward making AIM initiatives a grand success.

From a promising start in 2015, some challenging times in between, to its phenomenal growth over the last two and half years, AIM and its Atal Tinkering Lab innovations have come a long way since its inception. Being the Government of India's flagship initiative, the priority of AIM has always been to encourage innovations both from grass root levels and in our fast growing smart cities, promoting it not only throughout the country but over international platforms as well.

Looking at The Ingenious 50, one can proudly assert that the creative and innovative talent and capabilities of our young school students is world class throughout India, be it from the hilly, coastal or tribal districts or the advanced metro cities of India. it is also quite clear that Indian innovations have the power to create global impact.

This book is in itself a reward for our top 50 innovations of the year ATL Marathon 2018-2019 as it outlines the journey of students and their teams from a raw idea to noteworthy innovative implementation and impact.

I hope this compilation becomes an inspiration for other students and young minds across the country to create new promising sustainable solutions with national socio economic impact, leveraging emerging technologies accessible in over 5000 Atal Tinkering Labs, and 50 Atal incubators nationwide as of today.

We do envision path breaking growth in this innovation ecosystem created by our ATL schools and the remarkable contribution of its students.

Heartiest Congratulations to The Ingenious 50 and million others out there passionate to research, ideate, innovate and implement.

R. Ramanan

Place-New Delhi
Dated- January, 22, 2020

DR. AYESHA CHAUDHARY
Programme Director,
Atal Innovation Mission,
NITI Aayog

PREFACE

Atal Innovation Mission (AIM) is a flagship initiative of the Government of India, housed at NITI Aayog, with a focus towards creating an innovative and entrepreneurial ecosystem across India and its Atal Tinkering Lab (ATL) is a leading initiative aimed at disrupting the Indian education system. It is creating a paradigm shift, where children as young as 12 years of age are being introduced to the world of technology innovation, and are experiencing a culturally different micro-environment in Indian schools, which allows them to work in their area of interest without a fixed curriculum.

Since the birth of ATL, and over the years, I have witnessed an exemplary display of creativity and problem-solving skills from the young minds of our country. It has provided students of India with the resources and opportunities to ignite an innovative mindset.

As the tinkering lab mission is systematically honing young students on crucial 21 century skills including Creativity, Innovation, Critical Thinking, Social and Cross-Cultural Collaboration, Ethical Leadership and so on, this year, AIM is encouraging students with this wonderful compilation of top 50 grass root innovations by the students and their mentors. It captures the stories that showcase the growth and mindset of our young generation which have been collated in the shape of -The Ingenious 50 book. The book is an attempt to celebrate and boost the students who came up with exemplary ideas for problems put forth to them in ATL Marathon 2018-19 and their overall tinkering journey. I congratulate them all and wish them a bright future ahead.

The growth would not have been possible without the support of our mentors, school principals, teachers and parents of the students. This book is in itself an inspiration for the youth of India.

I would like to take this opportunity to extend my warmest gratitude and regard for all those who have made possible-The torch-bearers of ATL - The teachers and ATL in-charges have worked tirelessly, juggled their busy schedule and given their time, mentorship and guidance to the students which has been the driving force behind their excellence.

The parents and ATL Mentors have understood the need of the hour and motivated the students to explore new technologies and allocate their time towards tinkering and innovating in the lab. And most importantly the students themselves. It is all of you who have made ATL what it is today. Today's education system has pressured you into being one among the millions fighting to get a good grade, a good college and a good job. But all of you have stepped up, taken your time out from your commitments to innovate, play around with technology and gain the most important the 21st century skills that will equip you for the future.

From all of us at Atal Innovation Mission, NITI Aayog, Govt. of India, we pledge to work hard every single day and bring about a system which nurtures the creative, and innovative mind and thereby create an ecosystem that is conductive to innovation for all of you.

I also take this opportunity to thank the NITI Aayog Vice-Chairman Dr. Rajiv Kumar, the Principal Scientific Advisor to Government of India Prof.K Vijay Raghavan, the CEO NITI Aayog Mr. Amitabh Kant, the Mission Director Atal Innovation Mission Mr. Ramanathan Ramanan and all the members of Mission High Level Committee (MHLC) for their spirited leadership and continuous support to the Atal tinkering Lab.

My special acknowledgement for The Better India, IBM and GE for making ATL Marathon 2018-19 a success. I thank all the all the AIM incubators, who supported the ATL Student Innovator Program, while helping students in furthering their innovative ideas.

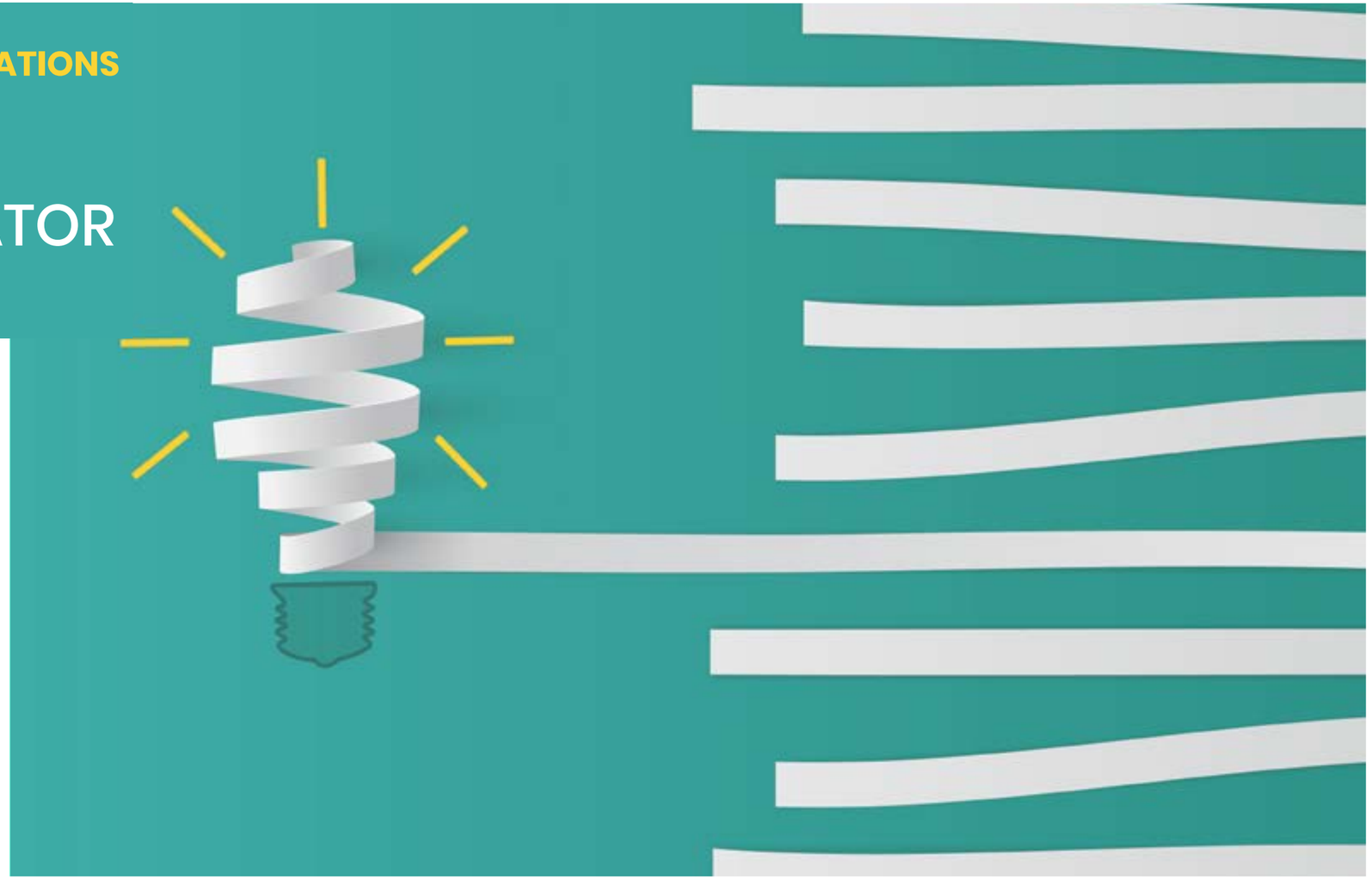
My special words of praise and thankfulness to the core team members Mr Ronak Jogeshwar, Mr Saksham Saxena, Mr Shashank Gore, Mr Vedant Sharma, Ms Naba Suroor, Ms Himanshi Gautam, Ms Vishnupriya Bijapur, Ms Kavya Bhandari, AIM administration and finance teams for relentlessly supporting the ATL program and to Ms Sumaiya Yousuf for editing the book.
Let's together continue to empower our young minds to innovate.

Happy Tinkering ☺

Top teams of ATL Marathon 2018-19 with the president of India Shri Ramnath Kovind at Rashtrapati Bhawan

CONGRATULATIONS

TO OUR TOP 50 INNOVATOR TEAMS!



Atal Innovation Mission (AIM), NITI Aayog is glad to honor the Top 50 innovations of Atal Tinkering Lab (ATL) Innovation Marathon 2018-19. This book is a compilation of some outstanding grassroot innovations by students and their mentors evolving from their ideas to a viable product, graduating them from tinkerers to innovators.

Note: Innovations are grouped according to the thematic area and in alphabetical order of their states.

ABOUT ATL

With a vision to 'Cultivate one Million children in India as Neoteric Innovators', Atal Innovation Mission is establishing Atal Tinkering Labs (ATLs) in schools across India. The objective of this scheme is to foster curiosity, creativity and imagination in young minds; and inculcate skills such as design mindset, computational thinking, adaptive learning, physical computing etc. Till date, 8000+ schools have been selected for establishment of ATLs. After compliance, each school receives a grant of Rs. 20 Lacs over five years to set up and maintain the ATL.

The Atal Tinkering Labs are based on the philosophy of incentivising innovations, which nurtures the growth mindset of young school children across the country. These students, when nurtured with mentorship support, address community challenges and create innovations which addresses them. They further deploy and test them with potential users. The effort has been to build an inclusive model for innovation by providing an equal opportunity to all regions and to all children irrespective of the rural-urban divide and government-private divide, by public-private partnership, events and challenges, mentorship from industry and academia.

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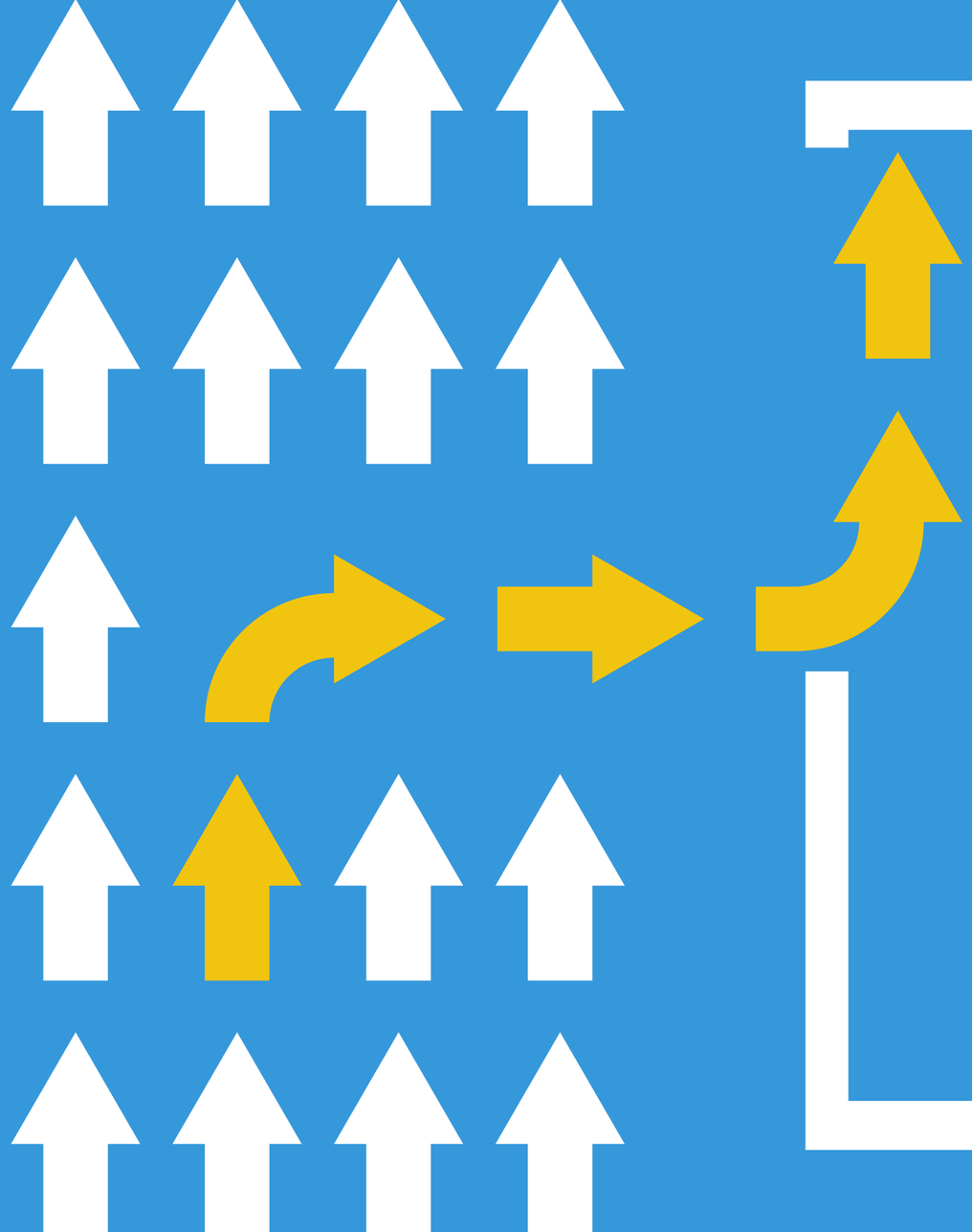

BIRTH OF ATL MARATHON

Einstein believed that creativity is an output of a 'combinatorial play' thinking process. He constantly combined and recombined ideas, images, and other various thoughts into millions of different combinations. So, 'Combinatory play' refers to the process of innovation by drawing on new combinations of existing data, perceptions and practices. There are thousands of existing innovations which can and should be further developed to make them cheaper, faster and more durable. So, the question here is "How can we take what we have and make it better?" In our ever-changing world, there is a need to build on these existing structures and concepts in order to make them more accessible and appealing to the general public.

Atal Tinkering Labs gives a chance to all children to express their innovative spirit, and propose novel, innovative solutions to India's community and social problems, with the ATL Marathon.

To identify India's best student innovators, Atal Tinkering Labs organized the ATL Marathon 2018-19, a nationwide challenge across 8 different focus areas viz. Clean energy, water resources, waste management, healthcare, smart mobility, agri tech, architecture and design, and SDGs. From over 1400+ innovations received, top 50 were selected based on novelty and prototype functionality. These top 50 innovations have been identified from 24 different states and Union territories in India.

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AGRITECH

GOVERNMENT HR. SEC. SCHOOL BILASPUR CG

INNOVATION
AGRITECH PVT LTD

DISTRICT
BILASPUR

STATE
CHHATTISGARH

STUDENTS
- YOGESH MANIKPURI
- MANISH YADAV
- NIKHIL PRAJAPATI

MENTOR
PAVISHP

> The team created a successful alpha model of 'Atal Krishi Mitra', an all-in-one device that takes care of all farming needs, at a low cost.

NEWS OF FARMER SUICIDES INSPIRED THIS AFFORDABLE SOLUTION

After reading about farmer suicides in newspapers, many people feel sad. But then they flip the page and move on. However, when something like this happens all around you, it's hard to ignore. This thought of an 18-year-old Yogesh Manikpuri, from the Government Higher Secondary School, Bilaspur prompted him to innovate.

In Bilaspur, such unfortunate incidents are a part of everyday reality. Many small-scale farmers have committed suicide due to the burden of debts. Sometimes, this also stems from the lack of funds to afford better farming equipment to improve yields.

"I came up-close to these issues through a friend who comes from a farming family. As the younger generation, we wanted to do our bit in solving the issue," says Yogesh.

He, along with Manish Yadav and Nikhil Prajapati, spent months to create a successful alpha model of the 'Atal Krishi Mitra', an all-in-one device which helps to take care of all farming needs, at a low cost of just Rs 2000.

Ploughing, sowing, weeding, cutting, pesticide sprinkling, fertilising, irrigation and harvesting - these standard steps in farming usually involve equipment that can be expensive for a small-scale farmer.

So they end up doing most of the work manually, thus limiting efficiency and output. But 'Mitra' device fills this gap as a multi-purpose tool at a small scale. And to address ground realities in villages, the device could run on electricity, solar-powered batteries or could be operated manually as well which makes it convenient for farmers.

Yogesh, a Class 12 student, adds, "To understand the grassroots impact of the innovation, we did a proper survey with 200 farmers. After using the same, we have received 95% positive feedback from them! This has given us a big boost and we hope this can transform the lives of hundreds of farmers in the future."

> "This is not just another science project one does to get marks. This is a lifetime opportunity for us. Our teachers and mentors know this and have gone out of their way to help us give our best to create something innovative for the larger good."

MINIGURUKULAM ST. GIRLS SCHOOL

INNOVATION
FARM CHOICE

DISTRICT/CITY
CUDDAPAH

STATE
ANDHRA PRADESH

STUDENTS
- U VAISHNAVI
- N VIJAYA NIRMALA

MENTOR
VENKATA SAI RAM

> With the help of IoT tools, the team created an IoT system which helped farmers manage their farms effectively and economically.

INTEGRATING AGRICULTURE WITH IOT, THESE STUDENTS SHOW HOW

India is an agricultural producing country with its own zeal for innovation. The students from Minigurukulam St. Girls School are from an agricultural family background. When they were exposed to resources in the Atal Tinkering Lab, they started ideating on making lives simple for the farmer community.

With the help of the IoT tools, students were able to create an agriculture IoT system which helps the farmers to manage their farms effectively and economically.

This system is capable of aiding the farmers with coverage over their entire crops, even in the remote areas. It is proposed to be economical and easy to use. The system has an irrigation unit that could constantly monitor the crop which could be pre-set by the farmer for various crops.

The soil moisture sensor available in the ATL monitors, the content of water in the soil through out the day. This date can be accessed by the farmers remotely from any where in the world using IOT. The data is processed for easy understanding for the farmers, so as to plant the next steps of farming or crop harvesting.

APSWR SCHOOL/ JR. COLLEGE FOR GIRLS, PEDAPAVANI, PRAKASAM

INNOVATION
AGRI MATE

DISTRICT
PRAKASAM

STATE
ANDHRA PRADESH

STUDENTS
- INAKOLLA VENKATA MIRDULA
- CHIRUTHOTI MAHESWARI

MENTOR
GANTA SALA DINESH

> The duo, decided to create a one-stop solution and came up with a prototype of the Animal/Bird alert system.

INNOVATION THAT SAVES CROPS AND KEEP ANIMALS AT BAY

Inakolla Venkata Mirdula and Chiruthoti Maheswari hail from rural areas where farming is the major source of income. Both the girls, currently in Class 9, have grown up seeing how uneven climatic conditions and insufficient water resources hamper crops.

While it was not in their hands to change the big problems, the girls took the challenge to solve the issue of animal threat to the farming fields.

These students of APSWR School, Prakasam district in Andhra Pradesh undertook a survey in their village and found how cattle and birds are adversely affecting the crops.

"Farmers here cannot afford manpower or machines that could keep animals at bay. Irrespective of which season it is, farmers have to guard their fields all through the day and sometimes even during the night. The old methods of installing scarecrows, beating drums or using bird resistant hybrids do exist. But they are not effective enough to prevent damage," says Inakolla.

The duo, thus, decided to create a one-stop solution and came up with a prototype of the Cattle Alert System. The system is user-friendly and it protects crops without harming cattle or birds.

This sensor-based prototype alerts farmers every time an animal enter the fields and also deploys counter measures to scare it away.

The duo then found that birds are scared of laser lights. "For birds, the system has laser lights on two sides of the field. So, whenever a bird tries to enter, a light is switched on to scare them away," Inakolla, further adds.

The girls hope to make their prototype a commercially viable product version which could ease the woes of farmers.

As per a report released by the Ministry of Agriculture, 63 bird species of birds cause damage to crops. Close to 53 bird species attack cereals and 14 bird species attack pulses. Birds like Grey Partridge, Blue Rock Pigeon and House Sparrow are most damage-causing birds.

In such a scenario, there is a dire need to address the issue of animal and bird attacks and with the help of Agri Mate, a lot can be done to address the issue.

APSWR CENTRE OF EXCELLENCE

INNOVATION
KISAN BHANDHU

DISTRICT
VISAKHAPATNAM

STATE
ANDHRA PRADESH

STUDENTS
- MONIKA GUDIVADA
- K.L.S.P. VARSHINI
- BHARATHI DARA LAKSHMI

MENTOR
RAMBABU THOKACHITCHU

> The team designed an eco-friendly robot that functions on solar energy and can save time and labour.

HOW STUDENT'S GRANDFATHER INSPIRED HER TO INNOVATE

Imagine a lush green farm thriving with paddy crops and vegetables. In the midst of this, instead of a farmer toiling under the sun for hours, there is a robot who has taken over tasks like ploughing and seeding.

Turning this imagination into reality, Class 9 students Monika Gudivada and Varshini Karedla have developed a prototype of a robot that can carry out multiple tasks.

"My grandfather is a farmer, and I observed how it was becoming increasingly difficult for him to complete agricultural tasks on his 3-acre plot of land. When I expressed this concern to my school teachers, they encouraged me to think of a solution, and that is how the concept of a multi-purpose robot was born," says Monika.

After spending months on research and technology, Monika, Varshini and Varshini designed an eco-friendly robot that functions on solar energy and can save time and labour.

The table-sized robot named 'Multi-Purpose Agricultural Robot' is equipped to perform key tasks like ploughing, seeding, watering, spraying biofertilizers and pesticides simultaneously.

The solar panels attached on the top of the robot convert solar energy to mechanical energy which runs it.

The students tested the robot in a local farmer's plot. Vouching for the time-saving technology, the farmers mentioned, "I use different equipment for different practices which is very time-consuming. This robot is capable of performing multiple tasks in one go and is wonderful."

Presently, the prototype demands the farmer to be in close proximity with the robot to operate it with a remote control. However, the students plan to make an autonomous machines connected to a smart phone.

APSWRS/JR COLLEGE (G), KOMARADA

INNOVATION
AGRI-TECH KIT

DISTRICT
VIZIANAGARAM

STATE
ANDHRA PRADESH

STUDENTS
- B ASWINI
- A JAYALAXMI

MENTOR
DURGA PRASAD PANDA

> The team came up with a device, which using sensors detects soil water quantity and switches on the motor automatically.

STUDENTS CREATE USER FRIENDLY AGRI-TECH KIT FOR FARMERS

Aswini and Jayalaxmi, two girls from APSWRS Jr. College, Komarada, Andhra Pradesh have devised a unique IoT and electronics-based solution which is easily adaptable and user friendly for farmers by and large.

Aswini hails from a family of farmers and understands the challenges being faced by the farmers across the country. She and her team member A. Jayalaxmi interacted with farmers close to their school and parents of some students in their school. They came up with a device, which upon using sensors detects soil water quantity and switches on the motor automatically. It also displays humidity and temperature of the soil.

The girls went to farmers in their area who expressed how they tend to waste a lot of their time gauging the soil quality and ploughing and watering the land to ensure appropriate soil moisture. The innovative solution can end this particular challenge faced by the farmers to a large extent. The device has also been field-tested by the team.

The duo has further worked on refining their prototype and have installed a regular switch on/off motor on the device. They further plan to connect the device to mobile phones that could direct all the details to it.

GOVT GIRLS HIGHER SECONDARY SCHOOL

INNOVATION
SMART AGRICULTURE IOT SYSTEM

DISTRICT
CHENNAI

STATE
TAMIL NADU

STUDENTS
- MADHUMITHA M
- PAVITHRA G
- SONAM A

MENTOR
PAVISH P

> Simplifying the process of farming and reduce crop destruction, the team came up with this effective solution.

AN INNOVATION THAT IMPROVES CROP GROWTH MANIFOLD

The moisture content in the soil is one of the primary factors that determine crop health, and any imbalance in the quantity of water could lead to crop destruction.

Thus, constant monitoring is needed to ensure every crop is given water in proportion.

Intending to simplify the process of farming and reduce crop destruction, Madhumuta M, Pavithra G and Sonam A from the ATL of Government Higher Secondary School, Chennai, have come with up with a unique solution, that is both economical and effective.

"Whenever farmers sow seeds in their fields, they need to observe the requirements of each crop manually. For instance, they need to measure the moisture level of the soil and ensure that the plant receives the exact amount of water. It is a hectic task, especially when the farmers are cultivating hundreds of acres of land," says Madhumita.

The girls, all of whom are students of Class 9, have designed a device 'Smart Agriculture IoT System' that can do the monitoring work in a hassle-free manner.

What farmers need to do is, to install the device in their farm and set a maximum soil moisture level for each crop variant. The system is integrated with sensors and IOT devices from ATL equipment that could measure humidity, temperature and light intensity.

Based on the moisture level of the soil, the automated controlling device will pump water when levels are low and stop the flow once the moisture reaches its maximum level.

The fresh data about the moisture level in each crop will further be sent live to the farmers via a private online channel on their mobile phones every 20 seconds.

By accessing the data, farmers will not only be able to eliminate crop damage but also identify ways in which they can improve the cultivation and watering methods.

In the future, the students hope to add more features to their device, that would help farmers identify crop infection.

You have to dream before the dream comes true.

-Dr. APJ Abdul Kalam

ARCHITECTURE AND DESIGN

GOVT. HIGH SCHOOL DADU MAJRA VILLAGE CHANDIGARH

INNOVATION
SMART HOME SAFETY DEVICE

DISTRICT
CHANDIGARH

STATE
CHANDIGARH

STUDENTS
- BIKASH KHADKA
- SUMAN DEGI

MENTOR
SONIA JAISWAL

> This home is equipped with multiple smart devices that protect it from theft or any gas or electricity hazards.

SMART HOME SOLUTIONS BY STUDENT INNOVATORS

"Just a year ago, I read a piece of scary news about a gas cylinder explosion in a building in Chandigarh. Someone had left the gas knob on, causing almost the entire building to burst into flames. This horrific news moved me personally. A momentary oversight can cost you your life," says 14-year-old Bikas Khadka, from the Atal Tinkering Lab of Government High School, Dadu Majra Village, Chandigarh.

No wonder then, when given the opportunity to use technology and find solutions for real problems, Bikas decided to work on creating a smart home safety device that could protect homes from issues like gas explosion or thefts.

Bikas and Suman Degi, a 15-year-old Class 10 student of his school, took five months to create a smart home prototype.

This safety device could set and alarm to alert any unauthorised entry into the house.

Also, in case anybody leaves the gas on by mistake, system turn the knob off automatically. Further, an exhaust fan strategically placed in the house ensures that all gas is removed quickly.

"There have been several theft cases in our area, which prompted us to include another feature of a password-protected digital lock system, instead of the normal key-operated one," says Bikas, who studies in Class 9.

"We started with a good concept, but there were many hurdles in the way. Most of it was due to our lack of experience and knowledge. That is where our mentors and teachers stepped in. Supporting us every step of the way, they helped us create this prototype. We are now trying to increase its scale by introducing this technology in an industrial set-up as well, and look forward to seeing this implemented across India, on a larger scale," says suman.

> **"I aspire to be an engineer someday and help create tech that can make a difference in the lives of lakhs of people. I feel my journey in doing so has begun with the ATL Tinkering Lab."**

GOVERNMENT HR. SEC. SCHOOL BILASPUR

INNOVATION
GREEN SHIELD

DISTRICT
BILASPUR

STATE
CHHATTISGARH

STUDENTS
- PRAKASH NIRMALKAR
- PRINCE KASHYAP
- HARISH CHAUDHARY

MENTOR
DR DHANANJAY PANDEY

> The team got the idea from the concept of thermos flasks and how water inside these flasks stays cold.

THIS INNOVATION COULD HELP KEEP HOUSES COOL IN ECO-FRIENDLY WAY

Bilaspur is well-known for its extreme summers. This was confirmed in 2017 when it recorded one of India's highest temperatures at 49.3 degrees Celsius. This sort of extreme heat is just one of the many environmental degradations that we have been imposing on the planet.

Another one that is ever-present is the careless dumping of single-use plastic, which chokes the soil and drains the water - adding to the heat.

"When we started to think of a solution to either of the problems, we realised we could tackle both at once," says 18-year-old Prakash Nirmalkar, from the Government Higher Secondary School, Bilaspur.

It took almost a year for Prakash and his team, Prince Kashyap and Harish Chaudhary, to create an architectural innovation they call the 'Green Shield'.

"We got the idea from the concept of thermos flasks and how water inside these flasks stays cold. For our prototype, we built special walls with a gap of 2 inches between them. These can be the usual brick and cement walls but need to have a 2-inch gap in between that would be filled with single-use plastic. This would not only help us reuse plastic sustainably but would also create strong yet heat resistant walls," says Prince.

Plastic is a bad conductor of heat, and that allows the walls, and in turn, the interiors of the house, to stay cool irrespective of the high temperature outside.

"Although this is still at a prototype stage, we hope to scale up this innovation to create a model region for the rest of the country to follow. This way, we are combating extreme heat on the one hand, while are also reusing an environmental burden!" says Harish.

> As a student, this is a great opportunity for me to serve my people while also contributing a great deal to my education. With the ATL Tinkering Lab in place, it is like getting wings for our dreams and ideas.

JAWAHAR NAVODAYA VIDYALAYA BILASPUR

INNOVATION
LABOUR ROBOT

DISTRICT
BILASPUR

STATE
CHHATTISGARH

STUDENTS
- PRAKHAR PRAKASH
- AASIF
- PRIYANSHU GUPTA

MENTOR
NAVIN GUPTA

> The team made a unique Labour Robot, that aids manual labourers, by reducing their burden.

STUDENTS TRY THEIR HANDS ON 'ROBOT FARMER'

India is a developing country - growing every minute. Not just in terms of GDP, but also as a physical expansion and development. From new transport facilities, bridges, roads to buildings, the nation is transforming every moment.

And, while our policies and other systems drive this change, the actual on ground work is being done by labourers, India's unsung heroes who spend their days and nights, building the nation for low wages.

"As students and future leaders, we wanted to create something for community of workers," says Prakhar Prakash, from the Jawahar Navodaya Vidyalaya, Bilaspur.

Along with Aasif, and Priyanshu Gupta, Prakhar has made a unique Labour Robot, that aids manual labourers, by literally reducing their burden.

Talking about the innovation, the Class 10 student says, "Through the model, we aren't trying to increase unemployment; we want to upskill them from being labourers to technicians. While the robot will effortlessly take care of all the hefty manual labour work, they can focus on managing the machine for optimal output, without putting their lives at risk physically. This will also ensure better wages for them, more productivity and improved lifestyle for their families."

Prakhar adds that a major focus of Labour Robot is also to increase efficiency in the agricultural sector of India.

"India is highly dependent on agriculture, and that makes innovation in the agri-tech sector, essential. So, Labour Robot also focuses on aiding the farmers in the process of farming. Usually, to increase productivity, farmers have to invest on different machines, but this robot can take care of it all. From ploughing, seeding, scrubbing, weeding, irrigating to harvesting, this robot can efficiently complete every single process of farming. This will not only make the process faster and less expensive, but also make a substantial impact in the lives of our farmers, and in turn the entire nation," Priyanshu adds.

> **"Our goal was to look around us and use our education to empower and positively transform lives. We wanted to raise the living standards of labourers. And, that is when the idea of upskilling them into technicians and introducing the robot, came in. But, all this would have remained a vague idea, had it not been for the ATL lab, which gave us the freedom and guidance we needed. We are forever grateful for this opportunity."**

MAHARAJA AGRASEN MODEL SCHOOL

INNOVATION
"कूरम गृह"

DISTRICT
WEST DELHI

STATE
DELHI

STUDENTS
- MANYA GARG
- SWATI KUMAR
- SHOURYA BANSAL

MENTOR
JYOTI SHARMA

> The team looked at a possibility of fixing many plastic bottles together, acting as air cells, and lifting the entire weight of a house.

FLASH FLOODS SPARKED AN IDEA AMONG THIS TRIO

In 2018, Swati, Shourya and Manya Garg watched in absolute horror as flash floods in India washed away families, homes and property. For them, it was devastating to see people lose everything they had. Deeply affected by the situation, they decided to form a team and work on flood-resistant homes, that could also work as rescue homes in times of crisis: Maharaja Agrasen Model School's Atal Tinkering Lab.

Think about how plastic containers or bottles float in water. So, using the principle of buoyancy, the team wanted to explore the possibility of several plastic bottles fixed together, acting as air cells, and lifting the entire weight of a house.

"We used 48-50 empty soft drink plastic bottles to lift the model house in our prototype, weighing 9.5 kgs using the principle of buoyancy during floods. And it was successful. Similarly, we inferred that big-sized bottles as per the weight of homes in the bank areas could be used to make life-size flood-resistant homes," said the team from Maharaja Agrasen Model School Atal Tinkering Lab.

The prototype has a strong metalic base with a layer of aluminium frame and meshes, which hold the bottles in place. The prototype structure moves vertically with the help of coaxial pipes, which are fitted in the steel pillars fixed to the ground. This setup ensures that the structure is intact and is not dislocated in an event of a flood or calamity.

"We have also installed a turbine to harness the energy of the flowing water into electricity and are now installing solar panels in the model to make it self-sufficient for rescue purposes too," they added.

> When we first started working on the project, everyone around us was cynical if the principle of buoyancy would work for a flood-resistant home. But we worked hard at our ATL to build and test a model that would pass the test. We even pulled off heavy labour work including drilling and welding, to create a model that was successfully tested. Thanks to ATL & AIM, says Jyoti Sharma, the team's mentor.

DELHI PUBLIC SCHOOL BANGALORE NORTH

INNOVATION
LEADING EDGE

DISTRICT
BANGALORE RURAL

STATE
KARNATAKA

STUDENTS
- SUHANI JAIN
- TANUSHA RAJESH
- SWADHA

MENTOR
KIRANMAI R

> The team came up with the idea after speaking to a few homemakers, who complained about dust falling on their face while cleaning ceilings.

THINKING OUT OF THE BOX TO KEEP HOMES CLEAN

Most of us have lifted a broom to clean ceilings in our homes, and are well-versed with the consequences— clumps of dust that fall on our face and the ground.

Being the enterprising people that we are, we cover our faces with a cloth or use a vacuum cleaner, but these are quick-fix or expensive solutions and do not work in the long run.

However, Suhani Jain, Tanusha Rajesh and Swadha from Delhi Public School Bangalore (North) have innovated a unique broom with an inverted umbrella, that promises to be a long-lasting yet affordable solution to this issue.

"The idea came to us when we spoke to a few homemakers and domestic helpers, who complained about how the dust falls on their face when they clean ceilings. This also exposes people to diseases like asthma, chronic bronchitis, heart and lung disorder. We brainstormed and finally came up with the idea of modifying a ceiling broom by attaching an inverted umbrella head to it," says Suhani.

So, whenever a person cleans the ceiling wall, the umbrella collects all the dirt, thus preventing it from falling on the floor or the face. Besides, the cloth of the umbrella is transparent, letting you see what dirt you are collecting.

The USP of the product is that it is cost-effective and does not need any electricity to work. The broom is extended with a PVC pipe, and the end of the umbrella's handle is attached below the pipe, which can be removed as needed.

The team is currently working on upgrading this prototype with one that is foldable and possibly automated so that it can fly up to the ceiling and clear cobwebs when the device is activated.

Even though we are surrounded by various devices and inventions, this simple solution by the girls prove that we do not need tonnes of money and expertise to solve everyday issues.

SRN INTERNATIONAL SCHOOL

INNOVATION
ECO BLACK TANK

DISTRICT
JAIPUR

STATE
RAJASTHAN

STUDENTS
- VANSH SHARMA
- YASH JHALANI

MENTOR
NAVEEN KUMAR

> The team's innovation aimed at helping farmers reduce, use of excessive chemical fertilizers to increase crop yield.

THIS INNOVATION CAN HELP FARMERS INCREASE SOIL MOISTURE BY 3 TIMES

In India, farming is a major profession in Rajasthan as well. And the problems that plague Indian farmers are both well-known and well covered.

What often gets lost in the flood of tragic stories, are the rays of hope that emergence, through the power of technology and innovation.

One such attempt is the Eco-Black Tank, crafted by Vansh Sharma and Yash Jhalani from SRN International School, Jaipur, Rajasthan.

Hailing from a village in Rajasthan, Vansh would often visit farmers in the area and speak to them about the problems that they face. After gathering enough information, a key issue the team decided to address is drought.

Farmers face drought almost every year in Rajasthan, and most of the crop dies due to a lack of water.

"We went on ground and interviewed farmers and found out that almost each of them wanted high yield, but did not have enough water resources. Due to that, some of them were using too much chemical fertilizers to increase crop yield. That's when we thought we should find a solution that would be organic and reliable," says Vansh.

After a few months of research, they came up with the 'Eco-Black Tank' method.

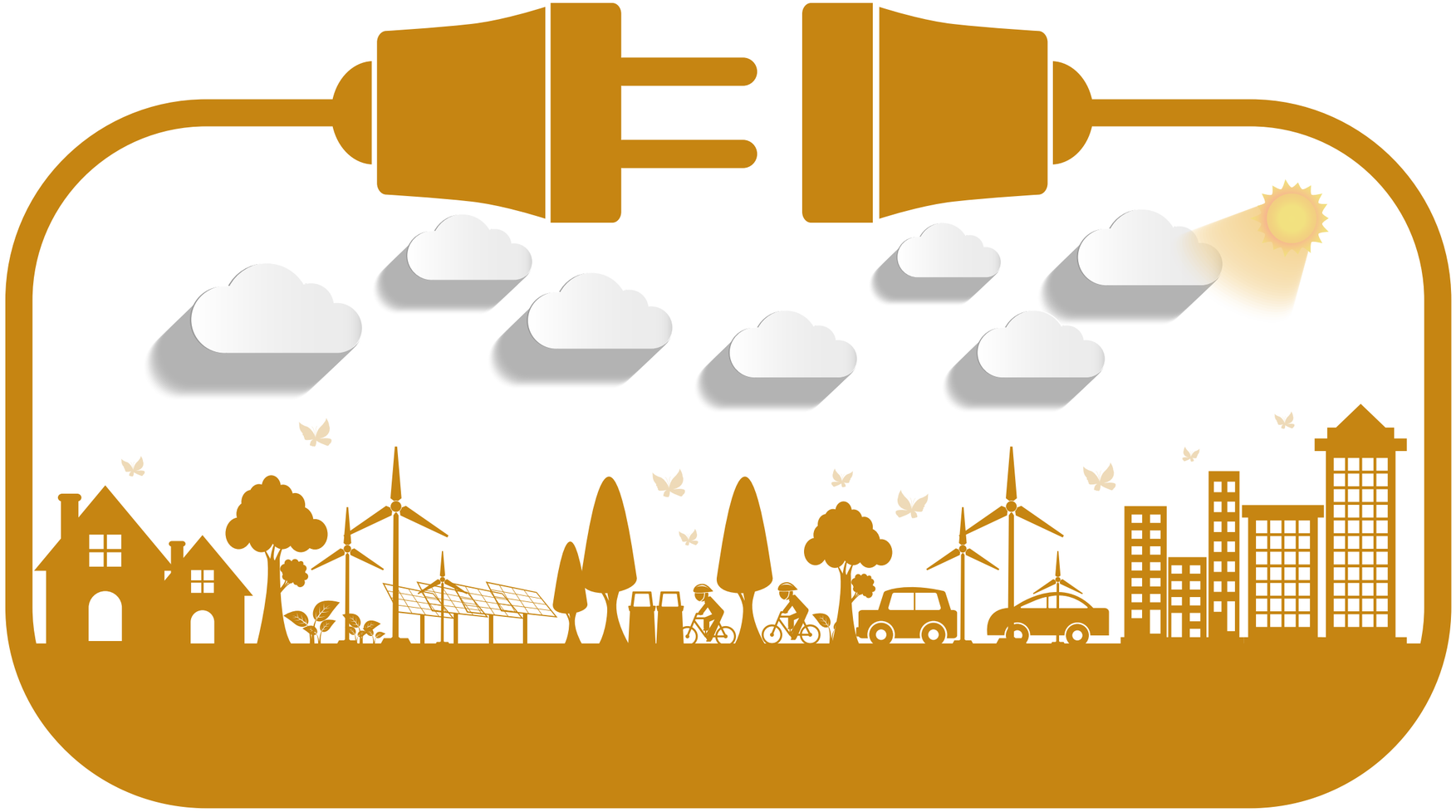
In this method, farmers are taught to spread a dark sheet over their topsoil. The sheet helps regain the fertility of the soil and increases soil water retention by 3-4 times. It is a tried and tested method that is sure to benefits thousands of farmers.

"Our innovation is currently at a prototype stage. We are working to create a proof of concept within the school premises by testing this in our school's farming area. The results and insights gained are promising. We hope to bring this to the consumer market soon, enabling farmers to multi-fold their yield," says Yash.

Awake, Arise and Educate,
Smash Traditions – Liberate!
We'll come together and
learn Policy-righteousness-
religion. Slumber not but blow
the trumpet.
O Brahman, dare not you
upset. Give a war cry, rise
fast. Rise, to learn and act.

-Savitribai Phule

CLEAN ENERGY



DELHI PUBLIC SCHOOL BHILAI

INNOVATION
ELECTROSPRINKLER

DISTRICT
DURG

STATE
CHHATTISGARH

STUDENTS
- KHUSHI GUPTA
- SHRUTI SINHA
- KRITI TIWARI

MENTOR
DINESH KUMAR JAWDEKAR

> The children converted the kinetic energy of the rotating sprinkler into electric energy with our prototype named 'Electrode Sprinkler'.

THESE TINKERERS ARE UPGRADING ELECTROSPRINKLERS FOR BETTER FARMING

India is an agro-based country. But farmers in India continue to face several issues - from water scarcity and debt to pest infections and poor market connections.

Solving these issues requires innovation at every level - including on the working of the humble water sprinkler.

These basic devices have a simple operational system. Each sprinkler rotates because of the pressure exerted on it by water.

And usually, this is where the process ends. But for some students from Bhilai, that is where the good idea began.

"When I learned about the electricity shortage faced by most farmers in our country, I was disturbed. I wanted to do something about it. While brainstorming ideas with my team, we remembered one of the lessons from our classes - the working principle of an irrigation sprinkler." says Khushi Gupta, from the Atal Tinkering Lab of Delhi Public School Bhilai, Durg, Chhattisgarh.

We thought of converting the kinetic energy of the rotating sprinkler into electric energy with our prototype named 'Electrode Sprinkler'," Gupta added.

Farmers use approximately 25-30 sprinklers in their fields. And though it may not look like it, these are enough to generate electricity for the farm.

Initially, it was challenging for Khushi and her team to generate sufficient voltage. But they soon took the help of Khushi's father, an electrical engineer, and turned their idea into reality.

"After a year of trial and error, we finally managed to generate close to 3.78 KW of energy through our innovation," says Khushi.

"I am a science student and have always had a desire to contribute to society. When I heard of the ATL Tinkering Innovation Marathon, it sounded like the perfect platform to take up a project and impact society at large. Competitions like these are a great way to turn our theoretical knowledge into practical implementation. My team and I look forward to making it a commercially viable product and benefit as many farmers as possible," she added.

SWAMI SHRADHANAND DAV CENTENARY PUBLIC SCHOOL, DAV ROAD, KHUNTI, JHARKHAND

INNOVATION
AKASHI

DISTRICT
KHUNTI

STATE
JHARKHAND

STUDENTS
- KHUSHI RANI
- AKANSHA KUMARISAHA

MENTOR
JOY BASU MALLICK

> They built a prototype with a sound sensor. The sensor gathers noise and converts it into electricity through vibrations.

DON'T CURB NOISE POLLUTION, USE IT!

Noise pollution has always been an issue in modern India, especially for those living near the highway. Funnily enough, though this is, of course, a nuisance, few people seem to consider the possibility of turning this output into something we can use. But these students have!

"While on the one hand there is an increased level of noise pollution in India, on the other hand, many parts of the country do not have electricity. We decided to combine these two problems and come up with a solution. Since it is not in our hands to curb noise pollution, we decided to use it and create something useful," says Akansha Kumari Saha from the ATL of Swami Shradhanand DAV Centenary Public School, Jharkhand.

The idea of converting noise into electricity occurred to Akansha and Khushi during an ideation session focused on identifying local challenges and its solutions.

They built a prototype with a sound sensor. The sensor gathers noise and converts it into electricity through vibrations. The converted energy is stored in a battery, and the LED lights in the prototype use the converted electricity to get power.

The innovation has many uses beyond a hand-held torch. For example, it can be used for city streets where there is constant noise, especially during the day.

"I would like to tell all young innovators like me that they should constantly try and come up with new ideas - ideas that would result in the betterment of the country and would involve young people in the process of building the nation," Akansha says.

EXCEL PUBLIC SCHOOL

INNOVATION
GREENFEATHERS.IN

DISTRICT
MYSORE

STATE
KARNATAKA

STUDENTS
- NOEL MATHEW
- NIKHIL MAHESH KUMAR
- VINYAS CHANDRA SHEKHAR

MENTOR
YOGA DEEBA S P

> The students through 'Power Flower' aim to address the issue of frequent power cuts in various regions across the country.

WIND ENERGY TO GENERATE ELECTRICITY, KNOW HOW

Improvising the current systems is the essence of Innovation. The students from Excel Public School, Mysore wanted to address the issue of frequent power cuts in various regions across the country.

As the population increases the energy requirement also increases. Fossil fuels are non-renewable and are vanishing fast. Solar energy, wind energy and tidal energy are some of the alternative sources of clean and renewable energy. Solar energy is widely used but the cost of installing solar panels is way too high. Compared to solar and tidal energy, the cost of production of electricity from wind is less. However, the existing Horizontal Axis Wind Turbines require a lot of land, have high maintenance cost and can work only at optimum conditions of wind speed and wind direction. The impact of these HAWTs on the environment is very high.

"We have developed a new and innovative design for a Vertical Axis Wind Turbine rotor blade. We have named our design "Power Flower". This design overcomes the aerodynamic constraints associated with regular Horizontal Axis Wind Turbines. Our new design will reduce the land requirement to setup wind farms."

We are looking at making more efficient Vertical Axis Wind Turbines that are compact enough to be installed on roof tops of urban houses. We are also interested to explore the possibility of combining solar panels and free energy generators with our wind turbines so that the land can be used to its maximum.

BHAVAN'S VIDYA MANDIR, GIRINAGAR

INNOVATION
3E-STECHULIKA

DISTRICT/CITY
ERNAKULAM

STATE
KERALA

STUDENTS
- SURAJ NARAYANAN
- ASWIN A M
- GOKUL S GANESH

MENTOR
JIYA P THOMAS

> The team is developing a unique solar energy tracking device called 3e-Stechulika.

UNIQUE SOLAR ENERGY INNOVATION TO TRANSFORM KITCHENS OF RURAL INDIA

Two years ago, Suraj Narayanan(17), was travelling in the interior most parts of Tamil Nadu, when he noticed how the women exposed themselves to hours of hazardous fumes every single day while cooking. "We all know the common rural practice of using firewood for cooking, but seeing it with my eyes made it so much more real. At that moment, I knew I had to work towards changing it," says Narayanan, from the Bhavan's Vidya Mandir, Girinagar, Kerala.

So, after returning home, the Class 12 student along with Aswin AM and Gokul S Ganesh, began to focus on harnessing solar energy for cooking.

After extensive research, the team, in 2017, started working on unique solar energy tracking device called 3e-STECHULIKA.

The three 'E' stand for Economic, Efficient and Eco-friendly, and STECHULIKA stands for 'Solar Tech Chulhika'. So, essentially, it is a solar energy tracking device, which maps the direction of the sun to manage maximum absorption of the light.

Its dome-shaped structure ensures maximum absorption, which is then trapped within the device battery and converted into heat energy. This can then be used to cook, as an eco-friendly alternative to 'chulha'.

Suraj explains that while using solar energy to cook is the primary goal, the trapped energy in the battery can also be used in multiple ways, including powering emergency lights.

What sets the device apart from the existing solar cookers is its versatility and its ability to maximise solar energy through the tracking device.

"Also, unlike the usual solar devices, it doesn't require continuously adjusted as per the sun to work. The tracking device makes sure there is efficient absorption at all seasons. The current model of 3e-Stechulika is an 80% working model, with pending modifications, which will make it more cost-effective in the long run," he concludes.

> **What's the use of big ideas without enough direction and guidance? As young people, we have an ever-flowing stream of ideas that are waiting to be tracked and brought to fruition, and the Atal Tinkering Lab made this possible for us. Our project would never have seen the light of reality if not for our mentors and ATL.**

DR. KALMADI SHAMARAO HIGH SCHOOL

INNOVATION
GURU: GRAVITY LAMP USING GURUTVAURJA

DISTRICT
PUNE

STATE
MAHARASHTRA

STUDENTS
- ANIKET GHISAD
- NACHIKET MENDKI

> The team wishes to convert GURU into a compact device which can be used anywhere anytime and by anyone.

GURU: GRAVITY LAMP USING GURUTVAURJA

Aniket and Nachiket are two students from Dr. Kalmadi Shamarao High School, Pune, Maharashtra who have come up with a model from the resources available around, making it easy and cost effective.

Over 1.2 billion people globally have no access to electricity and millions have an unreliable supply. Instead they use dangerous, polluting and expensive kerosene lamps for light. Fumes which are raised from the burning of biomass fuels can cause cataracts and eye infections as well as emitting smoke that is the equivalent to smoking two packets of cigarettes every day.

The students extensively researched how kerosene lamps causes 3%of the world's CO_2 emissions and are a significant source of black carbon, with even more intense local warming impact. Smoke from kerosene lamps causes respiratory problems. Accidental kerosene poisoning has potentially fatal consequences, particularly for children. Using kerosene inside homes can lead to devastating fires and burns.

The model costs less than Rs. 1,000 and the team aims to convert GURU into a compact device which can be used anywhere anytime and by anyone in the community. They hope to get technical help from corporates for refining their model and also to plan marketing strategies.

DC MODEL SR. SEC. SCHOOL

INNOVATION
DYNAMIC STREET LIGHTING SYSTEM

DISTRICT
FEROZEPUR CANTT

STATE
PUNJAB

STUDENTS
- NIKET GIRDHAR
- JAGTAR SINGH
- ANKUSH WADHWA

MENTOR
SAHIL ARORA

> The children created a successful prototype of a sensor-based street light system, which lights up only when needed.

STREET LIGHTS COULD BE MORE EFFICIENT WITH THIS INNOVATION

"I have seen the recurrent problems around street lights in my city. Streetlights are indeed essential, but they are also a source of excess electricity wastage," says 15-year-old Niket Girdhar, from the DC Model Senior Secondary School, Ferozepur Cantt, Punjab.

This problem got him thinking and gave birth to the Dynamic Street Lighting System. He, along with Jagtar Singh and Ankush Wadhwa, spent over five months to create a successful prototype of a sensor-based street light system, which lights up only when needed.

To ensure zero wastage of electrical energy, this street light system smartly senses the crowd and adjusts the intensity of light accordingly. For instance, for a huge crowd of people approaching the street, the lights generate 80% intensity, but for just two people crossing the area, it would be dimmer and comfortable enough to guide them.

The team understood that every year the municipal corporation in Ferozepur spends Rs 5 crore on street lights alone. But with the use of their street light system, they feel the city will be able to save 40% of the energy consumption and approximately Rs 2 crore.

"Owing to its relevance, we understand this is a problem not just here but all over the country. We hope to take this innovation to other parts of the country and help India save a significant amount of money in electricity consumption," says Niket.

> "Education is not just inside the pages of your book, it is all around you if you know where to look. And, the Atal Tinkering Lab has helped us build such an eye for seeing the problems around us and a mind for building the solutions. Not just our observation skills, but the level of curiosity has also increased in students, thanks to such an amazing opportunity!"

BAL VIDYA MANDIR SR. SEC. SCHOOL

INNOVATION
SMC FIREUP

DISTRICT
SAMBHAL
(BHIM NAGAR)

STATE
UTTAR PRADESH

STUDENTS
- ANANYA GUPTA
- AASTHA RASTOGI
- RITIKA
- HIMANSHI

MENTOR
YOGA DEEBA S P

> The children created Smart Street Lights, a prototype that detects an approaching vehicle via ultrasonic sensors.

THIS SMART STREET LIGHT COULD HELP REDUCE ELECTRICITY WASTAGE

Ananya Gupta, a student of Bal Vidya Mandir Higher Secondary School in UP's Sambhal district, always wondered about the streetlights that remain lit throughout the night in her colony as opposed to the dark alleys which are affected by insufficient power.

Ananya teamed up with her school mates Aastha Rastogi, Ritika, and Himanshi to create an energy-saving prototype.

'Smart Street Lights' is a prototype which will detect an approaching vehicle via ultrasonic sensors and automatically switch on the streetlight. Once the vehicle goes ahead, the light will be switched off.

The prototype has two types of sensors—a Light Dependent Resistor (LDR) sensor that will indicate a day and night time, and Photoelectric sensors that will detect movement on the street.

Another striking feature of the prototype is its ability to ensure road safety. In case of an accident, the street lights will notify the nearest hospitals and police stations to help accident victims get medical care immediately.

"We have tested the prototype and results were satisfactory. Lighting can account for 10–38 per cent of the total energy bill in urban areas. Here is our chance to save energy for future use and control the wastage of power. This project can be implemented for table lamps as well," adds Ananya.

She futher says that sensor-based lightning is a relatively common phenomenon, and yet it has not been widely implemented in India. With the young generation focussing on environment-friendly practices, the future seems to be safe.

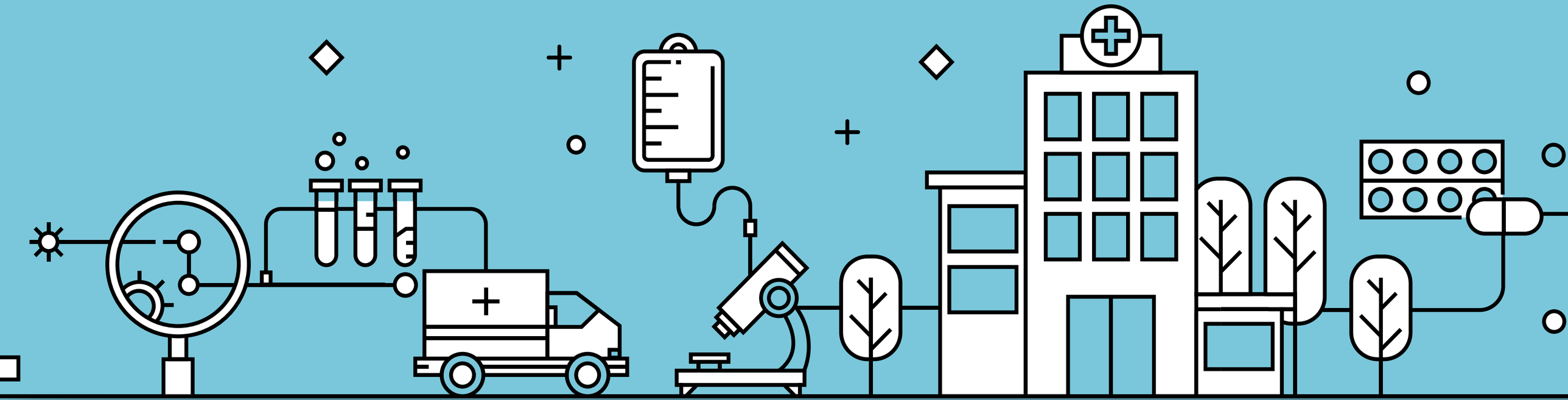
“

It is not about how much you do, but how much love you put into what you do that counts.

-Mother Teresa

”

HEALTHCARE



AMITY INTERNATIONAL SCHOOL SAKET

INNOVATION
SANGINI

DISTRICT
SOUTH DELHI

STATE
DELHI

STUDENTS
- NUMA KHAN
- AAYUSHI KAUSHIK
- KAAVYA JOSHI

MENTOR
AMBREEN KAUSER

> The team designed organic sanitary napkins that could be made by women themselves.

EMPOWERING RURAL WOMEN WITH ACCESS TO ECO-FRIENDLY SANITARY PADS

Many of us associate the term 'innovation' with just science, technology and companies. But there is a lot more to it. For example, it means making something new for the betterment of society as well. And most of these ideas come from elements we see in our daily lives.

Menstruation is one such major issue in the daily lives of most women, but that rarely seems to find innovations for it. Menstruation is a complicated situation that has social, health and environmental considerations.

While social stigma and the health of menstruating women are of major concern, one overlooked aspect is the state of non-biodegradable plastic sanitary pads. They are discarded once used but can sit in landfills for hundreds, if not thousands of years. But some innovations do address this concern.

"During our research, we found many women in rural India are not mindful about menstrual hygiene. They are also unaware of the availability of biodegradable and organic sanitary napkins," says Aayushi, a student from Amity International School Saket, South Delhi.

"So we decided to design organic sanitary napkins that could be made by women themselves and would be readily available in the local markets," she adds.

These pads (made of different natural components like cotton, sap gel and more), are very easy to make at home. They also include antifungal ingredients so that the pads do not harm the health of users.

"Napkins like these could help women get rid of ordinary pads made of harmful materials that can affect the body and the environment," Aayushi adds.

"We also want to provide DIY kits in rural areas so that women can make their own pads," says Kaavya Joshi.

"Our message to young innovators like us is that we should never give up hope. We have to be confident about our ideas and persevere." Kaavya adds.

MAMTA MODERN SR. SEC. SCHOOL

INNOVATION
VAYU SHODHAK

DISTRICT
WEST DELHI

STATE
DELHI

STUDENTS
- AARADHYA SHARMA
- ABHISHEK PODDAR
- MAYANK KATARIA

MENTOR
SANDHYA SRIVASTAVA

> The team developed Vayu Shodhak, a cost-effective and eco-friendly unique air purifier.

UNIQUE AIR PURIFIER BY STUDENTS COULD REDUCE AIR POLLUTION

Aaradhya, a Class 12 student of Mamta Modern Senior Secondary School, New Delhi, collaborated with her classmates, Mayank Kataria and Abhishek Poddar, and developed Vayu Shodhak, a unique air purifier at the ATL in their school.

"Delhi is choking. Even as I speak to you, the air quality continues to drop, worsening the congestion and breathing issues that my sister and I have been struggling with," begins Aaradhya Sharma.

"It isn't merely outdoor pollution that is affecting our lungs —it also exists inside our home, and is twenty times worse. I had had enough of suffering, and that is when the idea of developing Vayu Shodhak came to me," Mayank adds.

Elaborating on the merits of this cost-effective and eco-friendly air purifier, Vayu Shodhak is capable of removing dust particles up to PM 2.5. It reduces mould and unpleasant odours in the room and keeps mosquitoes at bay.

It also enriches oxygen in the room through the use of blue-green algae or cyanobacteria called spirulina. And above all, when compared to high-quality air purifiers that start from Rs 10,0000, Vayu Shodhak costs three times less.

The ATL at Aaradhya's school and the boot camp that the team attended was instrumental in turning their vision into reality. "We interacted with industry experts who not only praised our efforts but gave us effective feedback to turn our prototype into a fully functioning model. As school students, we had access to numerous resources on-demand that made the entire process incredibly smooth," they concluded.

> **"The idea came from the students themselves because these kids have not only observed the air pollution crisis in Delhi but lived it too. The Atal Tinkering Lab was extremely instrumental in helping our students execute this project and build their self-confidence. ATL gave our students the platform to take their innovations to a larger domain where they interacted with top scientists, experts and startups. The boot camp held in Bengaluru in August was a major confidence booster for the students. They were given access to the equipment they required to better their model. The students who were once hesitant, now ooze confidence. They are open to discussions and constructive feedback," says the team's mentor, Sandhya Srivastava.**

DAV PUBLIC SCHOOL

INNOVATION
CLARA SYSTEMS

DISTRICT
GURGAON

STATE
HARYANA

STUDENTS
- HARDIK KHANDELWAL
- MANAN THAREJA
- VIVEK MISHRA

MENTOR
VIVEK KUMAR BHUTANI

> Students of DAV Public School, have developed a portable and low-cost solution that curbs the rate of deaths caused due to heart diseases.

'PORTABLE HOSPITAL' THAT COULD MEASURE HEART RATE OF PEOPLE IN REAL-TIME

Did you know that one in four deaths in India occurs due to a heart-related ailment?

Did you also know that, as per the National Rural Health Mission, a whopping 61 per cent of primary health centres in rural India are functioning without a doctor, and almost half of the doctors in urban areas practice without a medical degree?

Taking cognisance of such alarming statistics, Manan Thareja, Hardik Khandelwal and Vivek Mishra of DAV Public School, Gurugram have developed a portable and low-cost solution that curbs the rate of deaths caused due to heart diseases.

"Called the 'Portable Hospital,' this is a smart solution that can measure the heart rate of a person in real-time, and provide instructions on what medical attention should be given to the patient," begins Manan.

The portable device consists of various health monitoring modules, ranging from ECG to blood pressure, which together are displayed live on a dashboard, making it easy to work with.

"Once the electrodes are attached to a person's body, a small screen will display a real-time graph of their medical condition, which can be shared with a doctor. Based on the person's Electrocardiogram (ECG), the doctor can immediately propose solutions. The readings will be stored in an app that we have created so that they can be accessed at any given time. The app can also transmit real-time data to the doctor while the patient is being treated," explains Hardik.

The best part about the solution is that it requires minimal manpower and all the raw materials are procured domestically, which ensures that they are affordable and readily available.

The trio has also been innovative in its prototype design by opting for open source programming, which allows for consumer-end modifications.

They plan to open source the code through which experts can experiment on the device to make it more effective.

"We have successfully conducted tests on several people and based on the feedback they are presently working on making the solution more effective," concludes Manan.

In a country like India, where issues like connectivity and insufficient doctors prevail, this cost-effective solution can indeed change the face of healthcare.

GOVT. SR. SEC. SCHOOL CHAUNTRA

INNOVATION
SWASTHYA SATHI

DISTRICT
MANDI

STATE
HIMACHAL PRADESH

STUDENTS
- RITIKA
- ANCHILA THAKUR
- RASHMI

MENTOR
SANDEEP VERMA

> The children innovated a smart medicine box called the 'Swasthya Saathi.'

OFTEN MISSOUT MEDICINE? CHECK OUT THIS INNOVATION

"I was very close to my grandfather. When his health began to deteriorate, he was prescribed several medicines. Since he wasn't highly educated, he found it difficult to read their names and would sometimes forget to take them on time. So, he was dependent on the rest of the family in this regard. He passed away last year, and his death created a big void in the family," recalls 14-year-old Ritika, a Class 9 student of the Government Senior Secondary School Chauntra, Mandi, Himachal Pradesh.

Ritika, who joined the ATL at her school, partnered with Class 10 student, 16-year-old Anchila Thakur and innovated a smart medicine box, 'Swasthya Saathi.'

"When our mentor, Sandeep Sir told us to make a list of problems that we observed around us, I couldn't help but think about my grandfather again, and people like him, who were at the risk of skipping timely medication schedules. That is when the idea of creating Swasthya Saathi came to me."

The team has created three different compartments in the box for medicines to be taken at different points of time, namely morning, noon and evening. They also installed LED lights and a buzzer in the box which is operated using an Arduino Nano microcontroller board. When it is time for the patient to take their medication, the LED light and buzzer in the respective compartment get activated and remind the user to take their medicine.

After visiting the Atal incubation Centre in Hyderabad and interacting with scientists and other experts, the team incorporated newer features like a real-time clock and added a vibratory motor and lithium batteries to turn it into a fully-functional model.

"After testing it locally, we are working on adding newer features like adding different coloured LED lights to denote the time of the day and installing a different alarm if the patient takes the wrong medication," concludes Ritika.

> **"It was only after the ATL was established in our school, that students started thinking about problems that plagued their surroundings and decided to work together, and brainstorm innovative solutions. These students come from a very humble background and do not have any opportunities or resources. So, ATL provided them with the platform to develop their innovative spirit. Some of them even interacted with students and experts from different states and incorporated their feedback successfully. They are more confident than ever and exude a different spark now. Thanks to ATL."**

DAV PUBLIC SCHOOL LAWRENCE ROAD AMRITSAR PUNJAB

INNOVATION
ASARA AFFORDABLE SMART ACCESS FOR RESCUE OF THE AGED

DISTRICT
AMRITSAR

STATE
PUNJAB

STUDENTS
- RISHAB AGGARWAL
- RACHIT AGGARWAL
- VIDISHA SINGH

MENTOR
RESHAM SHARMA

> Rishab Aggarwal innovated, 'ASARA' (Affordable Smart Access for Rescue of the Aged).

AN SOS DEVICE THAT COULD HELP ELDERLY PEOPLE IN EMERGENCY SITUATIONS

"I was sitting with my father and discussing some ideas around innovation when we thought of all the old people in our locality who live alone," says Rishab Aggarwal from Atal Tinkering Lab (ATL) of DAV Public School, Amritsar.

Father and son discussed how, many times, senior citizens are left alone at home when their children go out to work, on errands, or are out of the city.

Any accidents or mishaps at such times could be dangerous. Often, such aged people do not have anyone to call for help, and delays in assistance received can be life-threatening.

"Something to help out old people - this was the motivation behind my innovation. The idea of 'ASARA' (Affordable Smart Access for Rescue of the Aged) was born." says Rishab.

The small device can be easily fixed to the handle of a walking stick. In case of an emergency, all the user needs to do is press the 'SOS' button. The device will send an SMS alert to family members, neighbours, and other relevant contacts.

"When we approached some people living in and around the community and gave them a demonstration of the device, they were ready to buy it right away," says Rishab.

This shows how relevant this innovation could be. In today's day and age, when most family members have to leave the house for various reasons throughout the day, this could help bring peace of mind for many.

DELHI PUBLIC SCHOOL AMRITSAR

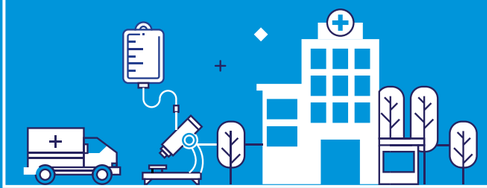
INNOVATION
APAH MEJORADO R.O

DISTRICT
AMRITSAR

STATE
PUNJAB

STUDENTS
- PRATEEK SINGH
- NITYA DEVGAN
- DOROTHY SOOD

MENTOR
SAMITA TANEJA



> Nitya Devgan and Dorothy Sood, Prateek, created 'Mejorado RO', an improved RO purification system.

THESE YOUNG INNOVATORS ARE MAKING POSSIBLE CLEAN DRINKING WATER

The absence of quality drinking water is one of the major issues in this country. With ever-decreasing levels of purity, most of those who can afford to do so have taken to drinking RO water.

However, many of them do not seem to realise that this kind of water is not always good for their health in the long run.

"We wanted to step in and fill that gap by re-purifying RO water and reversing its ill-effects, to generate clean drinking water," says 17-year-old Prateek Singh, from Delhi Public School, Amritsar.

Along with Nitya Devgan and Dorothy Sood, Prateek, a Class 12 student, took ten months to create the 'Mejorado RO', an improved RO purification system.

"Ideally, drinking water should have a PH value between 7.8-8.3. However, in most purifiers, it is between 6.2 -6.8. Additionally, the purification system also eliminates important minerals present in the water. Our prototype not only allows water to be at the correct PH value but the salt electrolytes installed in the device enhance its mineral content," he adds.

Prateek mentions that the team members have been using their innovation to purify the RO water available in the school and also perfecting its technology so that it can eventually be implemented in various other places like other schools, colleges, and hospitals.

"We are also trying to find a way to make the technology more cost-effective because we believe that clean drinking water is a necessity, and we want to make it available to all citizens."

> **"The usual CBSE curriculum can only do so much to make students understand the potential of what they are learning. The purpose of education is not just to pass exams, but to create something substantial, to truly use it for social good. And, thanks to the ATL Tinkering Labs along with a great group of teachers and mentors, a new, bigger, and better world has been made available to us. This hands-on experience is one of the most important lessons we have learned to date."**

Never say ‘No’, never say ‘I cannot’, for you are infinite. All the power is within you. You can do anything.

-Swami Vivekananda

SMART MOBILITY

AP MODEL SCHOOL

INNOVATION
FULLY AUTOMATIC TOLL COLLECTION PLAZA (FATCOP)

DISTRICT
GUNTUR

STATE
ANDHRA PRADESH

STUDENTS
- NAZEER SHAIK
- UMMAR FARUK SHAIK

MENTOR
SIRISHA KATRAGADDA

> The device after being inserted on the car's registration plate, gets scanned at toll booths where money is automatically deducted from the registered bank account.

THIS INNOVATION MANAGES TRAFFIC AT TOLL BOOTHS EFECTIVELY

"It was on a trip to Vijaywada when I came across a chock-a-block toll plaza. The idea of working on something to reduce traffic at plazas has stuck with me since then," says Nazeer Shaik, a Class 9 student from the Atal Tinkering Lab of AP Model School, Guntur.

Commuters in India need to have extra patience every time they come across toll plazas. They usually find themselves waiting for long stretches, sometimes even for hours, to cross the plaza.

In some cases, even emergency ambulances are stuck in traffic at such places. While smart cards have been proposed for some places, they will still need to be handled by a ticket collector manually. All of this means a new innovation is the need of the hour.

"To save time for commuters, we have come up with our innovation prototype called FATCOP (Fully Automatic Toll Collection Plaza). Our device needs to be inserted on the car's registration plate, and a scanner at the toll booths will deduct money automatically from the registered bank account of the car owner," says Nazeer.

"This method does not allow anyone to escape toll booths and can save time for all the commuters. We believe our approach is a one-stop solution to solve all the traffic problems at the toll plazas."

"Our innovation is here to make the experience of crossing toll plazas smoother, easier, and faster!" Nazeer says, adding "My message to all young people across India is that we need to think creatively to solve problems in society. That is how we, as a nation, will be able to grow and develop."

BHARATIYA VIDYA BHAVAN'S R.K.SARDA VIDYA MANDIR, RAIPUR

INNOVATION
ELI TRAM

DISTRICT
RAIPUR

STATE
CHHATTISGARH

STUDENTS
- SHATADHA SHARMA
- AASHNA KHANDELWAL
- PRANATI CHAVALI

MENTOR
SHRUTI MALHOTRA

> The prototype physically rises above traffic and travels above passenger cars to speed up mass transportation.

MAKING LOCAL COMMUTING BETTER

Going to school and returning home can be a nightmare for many students. Not because they are afraid of exams or teachers, but because of the road traffic they encounter every day as they commute to school.

Students in urban centres, especially cities, tend to take the school bus to commute. But the journey can be exhausting, both physically and mentally. They spend hours travelling. It actually wastes a lot of time and affects their productivity.

"My teammates and I were discussing ways to find a solution for this, and thus we came up with our innovation - the 'Future Transportation System'," says Shatadha Sharma from Bharatiya Vidya Bhavan's R.K.Sarda Vidya Mandir, Raipur.

Their prototype - a bus that physically rises above traffic and travels above passenger cars - is designed to speed up mass transportation. It is an 'elevator bus' on which 80-100 people can travel at a time.

The prototype is expected to elevate the bogie/compartment high enough so that the bus can take over the traffic from the above. The system can be activated automatically or with the push of a button.

Once the bus crosses such traffic, it would come back to a normal position and move like any other bus.

"The biggest challenge for us was to convert the idea into a model prototype. With the help of our mentors, we were able to do it in two months," Shatadha adds.

Traffic in India is a bane that takes a heavy toll on us all. Let's hope such innovations help us all glide over the major issue.

DR. K. B. HEDGEWAR SCHOOL

INNOVATION
SMART TRAFFIC LIGHT SYSTEM

DISTRICT
NORTH GOA

STATE
GOA

STUDENTS
- HRISHIKESH BHANDARI
- SANKET MARATHE

MENTOR
CHINTAMANI SHIRODKAR

> Such innovations are creating positive impact in thousands of lives across the world.

INTUITIVE TRAFFIC MANAGEMENT SYSTEM

Undisciplined traffic movement at Signals and zebra crossings have been the cause of innumerable accidents, Fatal or Otherwise.

Traffic Signals are there for a very good reason. Without them, motoring would be a chaos on today's congested roadways and many more traffic accidents would occur. Drivers who fail to obey traffic signals, put not only themselves but other motorists as well as pedestrians in danger of accidents and serious injuries.

The students of KB Hedgewar School, Goa, took this challenge and innovated an intuitive traffic management system.

After extensive research with the traffic authorities, motorists, and vehicle manufactuerers, they created a complete device which serves the purpose with ease and ensures high safety.

The solution is a (Smart Traffic Light System) STLS is a device that has 2 Innovative Features – reducing the speed of the vehicle with control methods when a vehicle approaches a signal and using the existing CCTV infrastructure of the traffic lights and the inter-connection of the signals to convert any traffic light into a smart Taffic light. The system predicts the density of vehicles with respect of time which the existing system does not.

Such innovations are creating positive impact in thousands of lives across the world.

ST. GEORGES H S S PUTHENPALLY

INNOVATION
IOT HELMET

DISTRICT
ERNAKULAM

STATE
KERALA

STUDENTS
- AMAL VARGHESE
- ANTONY K PRINCE
- AJITH PAUL

MENTOR
JINCY JOHN

> The team came up with a prototype doesn't let bike riders start their vehicle if they don't wear their helmets.

WITH THIS UNIQUE INNOVATION, NO BIKE WOULD START WITHOUT HELMET

While wearing a helmet does not ensure that you are not going to get into an accident, it certainly lowers the risk of injury and death. Unfortunately, many people who ride bikes wear helmets only when they see police officers conducting checks.

This happens despite the strict new laws that have been introduced by the authorities.

"We thought of doing something to make it mandatory for people who ride two-wheelers to wear a helmet, and came up with the 'Smart Helmet,'" says Amal Varghese from St. Georges Higher Secondary School in Puthenpally, Kerala.

Their prototype does not let wearers start their vehicle if they don't wear their helmets. A device is placed in the strap of the helmet, and another in the vehicle's engine. This strap is the key to all connections. Only when a rider locks the strap will the censors be activated and let the vehicle start.

There is also a sensor in the helmet that reads the rider's blood-alcohol level. The vehicle will not start if the person is above the limit.

"Apart from that, when the rider meets with an accident, the smart helmet will alert the nearest police station and hospital to make sure that they receive timely medical attention," says Antony, the co-creator of this innovation.

"We are also concerned about deaths happening due to drowsiness, so in the future, we plan to add a sensor that observes the eyes of the riders to gauge how drowsy they are," says Ajith Paul, the third innovator.

"We hope that our innovation will help reduce the number of accidents happening in India. It is disturbing to read about so many road accidents in the newspapers every day. A simple act of wearing a helmet can help save hundreds of lives, and that's exactly what we want to achieve."

DAV PUBLIC SCHOOL, CHANDRA SEKHARPUR

INNOVATION
THE CAR OF LIFE

DISTRICT
KHORDHA

STATE
ODISHA

STUDENTS
- SATEIK DASH
- ABHISHEK PADHY

MENTOR
DURYODHAN PRADHAN

> The prototype measures oxygen levels in a car and automatically switches on the AC fan when required, ensuring there is sufficient airflow.

INNOVATION INSPIRED TO SAVE LIFE

"About two years ago, there was an incident in Bihar where a child was trapped in a car and lost his life. A similar incident occurred in Delhi too," says Sateik, from the Atal Tinkering Lab of DAV Public School, Chandrasekharpur.

We often come across such tragic news, where toddlers and young children lose their lives due to a lack of oxygen after being accidentally trapped in cars for hours. However, the frequency of this news would shock anyone.

To put an end to this tragedy, students from DAV Public School have built a device titled the 'Car of Life'.

"The sensors in our prototype measure the oxygen level in the car and can automatically switch on the AC fan when required, making sure there is sufficient airflow. Before this, pressure sensors can gauge that there is someone inside the car based on the pressure on the seats and motion sensors."

Further, a buzzer will also start ringing once the AC fan is on and this alerts the pedestrians passing by. Only when the car is unlocked will the alarm stop ringing.

"In the future, we plan to add features that would send alerts to a registered mobile number linked to the car, alerting the owner," says Sateik. Developed in two months, devices like this can be a game-changer in the future.

DELHI PUBLIC SCHOOL, NTPC VIDYUTNAGAR

INNOVATION
BLIND SHOE

DISTRICT
GAUTAM BUDDHA NAGAR

STATE
UTTAR PRADESH

STUDENTS
- TUSHAR SHISHODIA
- ANIRUDH SHARMA

MENTOR
AMEET KUMAR

> The innovation uses GPS technology and a camera to help the visually-impaired navigate safely.

SAFTEY SHOES –AN INNOVATION FOR VISIUALLY IMPAIRED

The visually-impaired face a tough challenge in day-to-day life. From moving in and out their homes to buying items from a shop to even taking a walk - every day comes with a series of obstacles that must be overcome that sighted persons may barely notice.

However, as is the case with many things in the current world, technology is often the gamechanger. And this is exactly what the 'Smart Blind Shoe' innovation hopes to be.

"I saw a visually-impaired man in a medicine shop. He was struggling to move around as he had lost his cane. That day I realised how difficult things could be for visually-impaired people and was inspired to innovate to help them. That is how the idea of the 'Smart Blind Shoe' came to my mind," says Tushar from the Atal Tinkering Lab of Delhi Public School, NTPC Vidyutnagar.

Tushar and his team have been working on the shoe for close to two years. The innovation uses GPS technology and a camera to help the visually-impaired navigate safely. The camera monitors the route and informs users when there is an obstacle.

This feature is hoped to be very helpful for the visually-impaired, especially when they are travelling to new locations.

"We also have a remote for users if they get lost on the way. With just the press of a button, the device will notify the family members about the whereabouts of the user," says Tushar.

"Innovation requires a lot of time, effort, and patience. Never lose hope when you don't get the desired results immediately and want to drop your idea. Give yourself some time to solve the problems. And when you finally find the solution, you will feel immensely satisfied that you have done something great to help others in the world," adds Tushar's teammate Anirudh Sharma.

“The journey matters as much as the goal.”

-Kalpana Chawla

SUSTAINABLE DEVELOPMENT GOALS

APSWR SCHOOL JR. COLLEGE GIRLS TALLAPALEM VISAKHAPATNAM DISTRICT

INNOVATION
MAGIC HEARING

DISTRICT
VISAKHAPATNAM

STATE
ANDHRA PRADESH

STUDENTS
- PRIYANKA
- SANDYA SRI
- HEMA LATHA

MENTOR
SYED SHABAZ AHMED ALI

> 'Magic Hearing' - a hearing device helps a hearing-impaired student while still being as unnoticeable as possible.

UNNOTICEABLE HEARING DEVICE MADE POSSIBLE BY ATL STUDENTS

The students of APSWR School Jr College Girls Tallapalem Visakhapatnam District always felt that the lone hearing-impaired student among them was bright but quiet.

The few of them who tried to understand why she was so withdrawn quickly figured out that she felt left out at most times. And adding to the difficulty was her hearing aid, which was very visible, and so stood out as a 'disability' in the crowd.

"Due to this, she eventually lost interest in academics and studying. It made her conscious that everyone around knows that she has some disability," says Priyanka.

Forming a team, Priyanka surveyed a few other hearing-impaired people and received similar feedback.

"That's when we thought we should innovate a hearing-aid machine that would be invisible, yet serve the purpose," she says.

After months of trial and error, the team came up with a final prototype - the 'Magic Hearing' - a hearing device that helps while still being as inconspicuous as possible.

There were quite a few challenges that the team had to face while building this innovation.

The students struggled to keep the product minimalistic initially as there were many wires involved in the prototype. Another issue they faced was to cancel unnecessary noise in the device.

"With the help of menotrs, the prototype was eventually successful and tested as well," Priyanka says.

GOVT. HIGH SCHOOL DADU MAJRA VILLAGE CHANDIGARH

INNOVATION
HEALTH DEVICE

DISTRICT
CHANDIGARH

STATE
CHANDIGARH

STUDENTS
- AMAN SINGHAL
- SHUBHAM

MENTOR
BHARAT BHUSHAN

> The team tried to detect occurrence of colour blindness in young students and also created a medicine reminder for remedial action.

INNOVATION THAT HELPS PATIENTS WITH NIGHT BLINDNESS

Detection of diseases within time is always the key to an effective cure. This has been well understood by the students of Govt. Model Sr. Secondary School, Dadu Majra, Chandigarh.

With the resources available locally and at the Atal Tinkering Lab, students Aman Singhal and Shubham with their ATL mentor Bharat Bhushan tried to detect occurrence of colour blindness in young students and also created a medicine reminder for remedial action.

The students believe that the conventional equipment present in hospitals and clinics are expensive and thus unaffordable for the poor. Thus, their colour blindness detector which runs on low electricity and which can be operated easily by anyone can be used to detect this disease effectively.

"People are not aware about colour blindness, therefore there is a rise in such cases in our community. Our innovation educates, detects and also provides remedies for this disease"

DAV PUBLIC SCHOOL, VASANT KUNJ

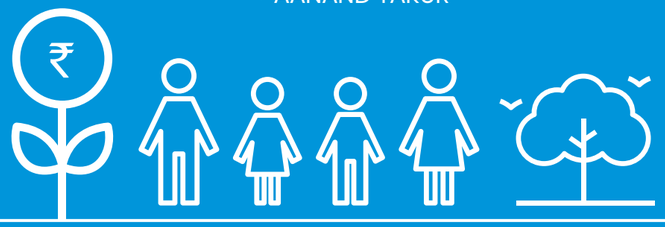
INNOVATION
SUPER EYES

DISTRICT
SOUTH DELHI

STATE
DELHI

STUDENTS
- AAYUSHI JAIN
- DEEPANKAR AGGARWAL
- AANAND TAKUR

MENTOR
VANDANA DEEPAK



> Students decided to help the visually impaired by creating a device that would help them - the 'Super Eyes'

AUDIO BOOKS-SAVIOUR FOR SIGHTLESS STUDENTS

There are more than 50 visually-impaired students in the DAV Public School Vasant Kunj, New Delhi. Other students in the film often felt the visually-impaired students left out and uncomfortable around other students.

Though the hope was to promote an inclusive education system, basic obstacles seem to prevent a major shift towards acceptance, comfort and convenience.

That is where Aayushi Jain and her team enter, determined to make a difference.

The team asked visually-impaired students about their needs and were informed that it would be great if they could read more than just the audiobooks provided to them by the NCRET.

"That's when we thought about creating a device that would help them - the 'Super Eyes'," says Aayushi.

The innovation scans and converts printed text in any book or newspaper into an audio clip which can be played by the user. The idea is that this will help the visually-impaired instantly, rather than restricting them to only some books.

Shaped like a VR box, the visually-impaired have to strap the device to their eyes and attach an earphone, so that they can hear it. It works by scanning the text in front of it - essentially 'reading' out what is before the user's eyes.

"In the future, we are planning to attach the camera to a pen and make the reading experience easier and simpler for the visually-impaired," says Aayushi.

A stunning innovation that will definitely have a real-world impact on those who need it the most.

PATHIPAGA CHEMMAL K GANAPATHI GOVERNMENT HIGHER SECONDARY SCHOOL

INNOVATION
AI BIOMETRIC VOTING MACHINE

DISTRICT
CHENNAI

STATE
TAMIL NADU

STUDENTS
- VISHAL A
- SUSJIL RAJ SINGH R J
- SUDHARSAN N

MENTOR
SATHIYAN S

> We conceptualised and built the AI Biometric Voting Machine which can directly be linked to the Aadhar details of citizens.

CASTING VOTE MADE EASY BY YOUNG INNOVATORS

Over the decades, millions of Indians have migrated from rural to urban areas looking for better job opportunities. Many of them have even moved to different states.

This increase in the rate of migration is one of the reasons why voter turnout tends to dip during the elections, as many migrants are unable to return to their homes to vote.

The AI Biometric Voting Machine, build by 17-year-old Vishal and his team from the Atal Tinkering Lab of Pathipaga Chemmal K Ganapathi Govt. Higher Secondary School, Chennai, hopes to solve this issue.

"We conceptualised and built the AI Biometric Voting Machine within three months," says Vishal

The prototype is such that the machine can directly be linked to the Aadhar details of citizens. The fingerprint sensor captures and matches the biometrics. Further, it eliminates multiple entries/voting which prevents malpractices As the equipment is linked to Aadhar, a person could cast their vote from the city that they live in without having to travel.

"When we started, we had very little knowledge of coding and programming. And being in Class 12. Luckily, our parents, teachers and principal offered the much-required support and encouragement." Vishal says.

We hope and look forward to seeing India using our innovation to choose its leaders in the future." he adds.
School Name: Pathipaga Chemmal K Ganapathi Govt. Higher Secondary School, Chennai.

> ATL Tinkering Lab came to our school in 2016 and since then we have received a lot of support. We would like to thank our mentors who guided us throughout the process of developing this prototype. We are school kids and we did not have access to all the technology required. We did not know much about programming either. But with the training received at the Lab, we are now able to bring our vision to reality. We have been trained in critical thinking and documentation as well, which has helped us in presenting our ideas better. Moreover, our parents were not aware of the importance of such competitions and ATL Tinkering Lab inspired them to encourage us to participate.

KENDRYA VIDYALAYA DRDO KANCHANBAGH

INNOVATION
AUTOMATIC SCHOOL BELL SYSTEM USING RASPBERRY PI

DISTRICT
HYDERABAD

STATE
TELANGANA

STUDENTS
- SHREYA UPADHYAY
- PUJEETHA I
- ADITI CHAUDHARY

MENTOR
SANDEEP UPADHYAY

> Such innovations help hone the Design Thinking skills of students and is successful in making them better innovators.

STUDENTS CREATE DIGITAL BELL FOR SCHOOLS

Looking for areas of improvement in one's own school is the first step of leveraging an Atal Tinkering Lab. This is what the innovators of Kendriya Vidyalaya Kanchanbagh did with their school Bell.

Though we live in 21st century and technology being a part of our daily lives, many hundreds of schools across the nation use traditional methods of hitting a metal using a stone as an indication of a period ending and beginning of another. At many schools either the schools support staff has to ring the bell or the students themselves, which may result in poor time management.

"The advantage of this design is that the bell rings at the start of each period and also announces the period number without any human intervention to a great degree of accuracy and hence takes over the manual task of switching on/off the school bell with respect to time. It offers complete customization of the schedule daily. Also, it has an option of holidays which can be set and the system will not ring on those holidays."

Such innovations created out of emphasizing with the people around one hones their Design Thinking skills and makes them better innovators.

AMITY INTERNATIONAL SCHOOL

INNOVATION
HERBAL PRETREATED ANTIFUNGAL AND ANTIBACTERIAL COTTON

DISTRICT
GHAZIABAD

STATE
UTTAR PRADESH

STUDENTS
CHHAVI SHARMA
KRISHI BHATT

MENTOR
POONAM BHATT

> Chhavi Sharma, Krishi Bhatt and Poonam Bhatt, have designed a unique biodegradable sanitary pad.

GIRLS CREATE HERBAL SANITARY NAPKINS FOR BETTER HYGIENE

"When we were first taught about menstruation in Class 8, we understood the problems that we could face during our periods. Two things, among other issues, were of serious concern. One is the usage of regular sanitary napkins that can cause serious fungal infections and the other was unscientific disposal of used napkins that cause environmental hazards," says Chhavi.

But Chhavi and her friends did not leave the issue alone. Indeed, they took it upon themselves to find a solution for it.

Students from Amity International School, Ghaziabad, Chhavi Sharma, Krishi Bhatt and Poonam Bhatt, have designed a unique biodegradable sanitary pad.

Generally, used napkins either end up in water bodies or in landfills and take hundreds of years to decompose. But these will degrade in a safe manner in a year or so.

The herbal sanitary napkins designed by these girls work just like your regular napkin and last for 6-7 hours. Also, their cotton-based layers ensure a rash-free experience.

The trio's passion for coming up with a safe solution stemmed from a chapter on menstrual hygiene that was taught in the school three years ago.

It has been estimated that there are close to 336 million menstruating women in India of whom only 36 per cent have access to sanitary pads. Even today, a majority of women use unhygienic things like using old clothes and leaves which exposes them to infections.

The team is also trying to address this concern by hoping to make these herbal sanitary pads affordable so that women from every stratum of the society can use them.

"There are a few herbal and biodegradable products available in the market, but they are not affordable. Our pads are low-cost and it makes our herbal sanitary napkins unique," asserts Chhavi.

Source: Times of India

“Don’t give up as there is always a next time.”

-Mary Kom

WASTE MANAGEMENT

APSWRS JUNIOR COLLEGE FOR GIRLS

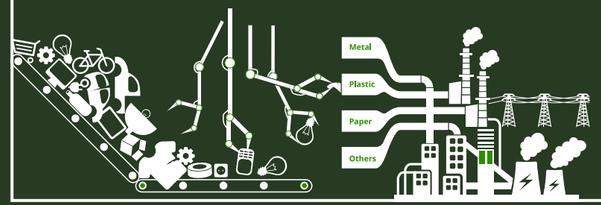
INNOVATION
INTELLIGENT BINS

DISTRICT
WEST GODAVARI

STATE
ANDHRA PRADESH

STUDENTS
- E AVILASHA
- K CHADU PRIYA

MENTOR
VINAY BABU



> The team further wished to develop their project by integrating it with a web server which can be accessed by municipality people

INTELLIGENT BINS THAT PREDICTES OVER FLOW

Two young girls Avilasha and Chadu Priyaof eighth class from APSWRS Junior College for Girls, West Godavari, Andhra Pradesh. As young kids they observed how even though people throw dust in dustbins, the dustbins tend to overflow and also no proper information is provided to municipal authorities about the dust levels.

As per the report by National Green Tribunal (NGT), "Barely 1,000 TPD of solid waste was being managed by all the urban local bodies as against the generated 6,400 TPD in the state of Andhra Pradesh."

The girls of APSWR School, West Godavari in Andhra Pradesh interacted with school students and people in their community. They came up with multi-level indication to give predictions to possible overflow of dustbins to municipality people and also people who are throwing dust. This they were able to achieve leveraging the technologies like IoT and electronics.

To further refine their prototype, the team worked on improving the level detection of waste and to sense the intensity of the odour for providing recommendations based on the intensity of the odour.

The girls further wish to develop their project by integrating it with a web server which can be accessed by municipality people to see the heat map of dustbins to take steps to remove the dust in dustbins.

GOVERNMENT HR. SEC. SCHOOL BILASPUR

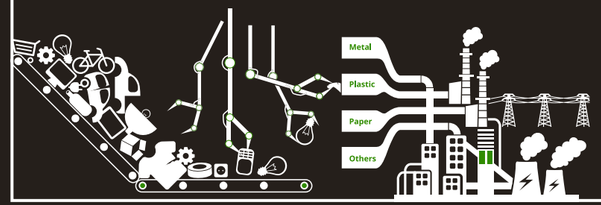
INNOVATION
SMART BIO TOILET

DISTRICT
BILASPUR

STATE
CHHATTISGARH

STUDENTS
- YOGESH MANIKPURI
- MANISH YADAV
- NIKHIL PRAJAPATI

MENTOR
DR DHANANJAY PANDEY



> The prototype of smart bio-toilets come with several smart features, without too much human intervention.

SMART BIO TOILETS THAT ENABLES AUTO CLEANING

The lack of basic sanitation facilities is a major issue across regions in India, but it is especially distressing to face this problem while travelling. It is very common to come across toilets and bio-toilets in a dismal state, especially in stations or trains.

"You can only do so much to change people's behaviour. Sometimes, technology needs to step in to fill the gaps. That prompted us to find sustainable solutions and improve the existing model of bio-toilets by creating our version of smart bio-toilets," says 18-year-old Yogesh Manikpuri, from Government Higher Secondary School, Bilaspur.

Along with Manish Yadav and Nikhil Prajapati, Yogesh, a student of Class 12, spent months creating the beta model of a Smart Bio Toilet, which has solutions for three of the major problems in the existing bio-toilets - choking, odour and a lack of flushing.

Their prototype of smart bio-toilets comes with several smart features, that enable the toilets to be clean and fresh-smelling at all times, without too much human intervention.

For instance, the toilet seats are closed with a metal plate, fitted with sensors. The sensor activates and opens the plate only when a person comes close to it to use it. Also, once the person has finished using it, the toilet automatically closes, flushes itself and cleans itself with an in-built soap dispenser.

To ensure that there is no choking, the team has installed special cutters inside the commode, that can cut and crush any foreign object thrown inside. All the waste is then collected into a bio-tank filled with bacteria that can break it all down with water. This water is then purified to be re-used in gardens, farming as well as for cleaning the toilets.

"Currently, we are at the beta stage, and the Indian Railway officials have shown immense interest in implementing these improved toilets after we address the remaining technical concerns. We are hoping to take this further and commercialize it." Yogesh says.

> **"This is not just another science project one does to get marks; it is a once-in-a-lifetime opportunity for us. Our teachers and mentors know that and have gone out of their way to help us use our best potential to create something for a larger good. For instance, to make our work more relevant and our research more in-depth, our mentor took us to the regional Railways commissioner. We have been successful in creating this model with their guidance and expertise. We hope to do better in the future!"**

SALWAN PUBLIC SCHOOL, RAJENDRA NAGAR, NEW DELHI

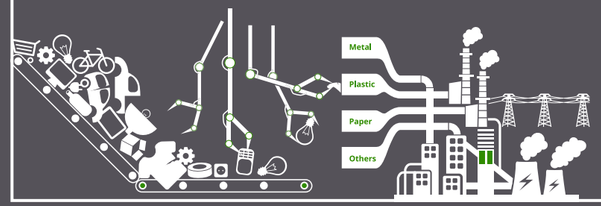
INNOVATION
MOS-BITE

DISTRICT
NEW DELHI

STATE
DELHI

STUDENTS
- ANANYA BHATIA
- RIDHI KALIA
- SEHEJ SONI

MENTOR
DR. SHILPA RAGHUVANSHI CHAUHAN



> The team came up with the idea of using cigarette butt waste to make engineered larvicidal cakes.

UNIQUE SOLUTION FOR PATIENTS WITH MALARIA

"When our house-help fell ill and was diagnosed with malaria, I visited her home, which is located in an area that is a breeding ground for mosquitoes. I couldn't help but think about how several people there were at the risk of acquiring malaria, and may not have the means to get treatment at a private hospital or have the money to invest in preventive measures that effectively keep the mosquitoes at bay. So, I decided to find a solution," says 16-year-old Ananya Bhatia, a Class 12 student from the ATL at Salwan Public School, New Delhi.

Under the guidance of Dr Shilpa Raghuvanshi Chauhan, Ananya and her team members, Ridhi Kalia and Sehej Soni, began their research to develop a solution which would be unique, practical, cost-efficient and accessible.

"We came up with the idea of using cigarette butt waste to make engineered larvicidal cakes. Shilpa Ma'am who had researched on nicotine told us how it had larvicidal properties that could kill mosquitoes," explains Ananya.

After various trials and errors, the team managed to create the perfect combination to create Mos-bite, a larvicidal cake.

When added to stagnant water, it starts fermenting and produces carbon dioxide. This carbon dioxide attracts mosquitoes and acts as bait. In 24 hours, unlike other mosquito repellents, it kills both the adult mosquitoes as well as larvae, using nicotine's larvicidal properties.

It can be put in your cooler, a flower pot, or a puddle of stagnant water and it will start working its magic in 24 hours.

The product was tested at the National Institute of Malarial Research on Anopheles mosquitoes, and it was successful.

Ananya acknowledges the critical role that ATL and NITI Aayog played in this journey.

"They provided the much-required edge to our project, where we went beyond the eight-period timetable in school, looked for out of the box solutions and built them successfully!"

> **With Mos-bite, we were able to successfully develop an affordable and accessible solution while also turning cigarette butt waste into something useful. When we distributed the final tested product to nurseries and slums in the area, the response was exceptional. ATL oiled the wheels of this project by providing the girls with all the support they required. Thanks to ATL, students are now discovering the wonders of science beyond their school hours, interacting with top scientists and experts and finding new perspectives," says Dr. Shilpa Raghuvanshi Chauhan.**

JNANA PRABODHINI NAVNAGAR VIDYALAYA

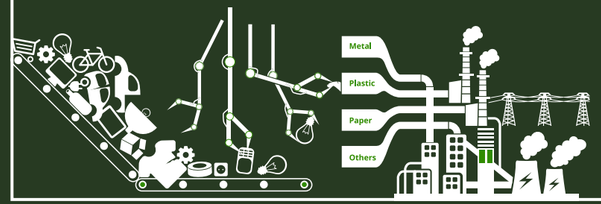
INNOVATION
A.R.C. SYSTEM

DISTRICT
PUNE

STATE
MAHARASHTRA

STUDENTS
- TANISHA DHADIWAL
- SHRUTI KESKAR
- SHRUTI KULKARNI

MENTOR
KALPESH KOTHALE



> This system, designed and tested by the team, is placed under the food table of each compartment for passengers to throw their waste.

BEST SOLUTION FOR WASTE MANAGEMENT IN TRAINS

"Once, when we were travelling by train during a school tour, we noticed that there were no dustbins in the sleeper class. Only the first-class compartment had a dustbin. A lot of our friends were tossing biscuit wrappers and other packets under their seats or outside the window. Not because they wanted to, but because the only available dustbin was overflowing," says Tanisha Dhadiwal of Jnana Prabodhini Navnagar Vidyalaya, Pune.

This is a common problem faced across India. But Tanisha and her team decided they had to innovate a solution to this problem. And thus, the 'Railway Waste Management System' was born.

This system, designed and tested by the team, can be placed under the food table of each compartment, and passengers can throw their waste under the vertical bend.

The disposed waste is crushed and immediately removed via a chute to a base tank, common for two compartments. That way the dustbin never 'overflows'. The collected waste can be sorted by cleaners once the train reaches its destination.

"We believe this system can make it easier for both the passengers and the cleaners. In the future, we hope we can implement our innovation in our railways and make India a cleaner country!" Tanisha adds.

GOVERNMENT SENIOR SECONDARY SCHOOL YANGANG SOUTH SIKKIM

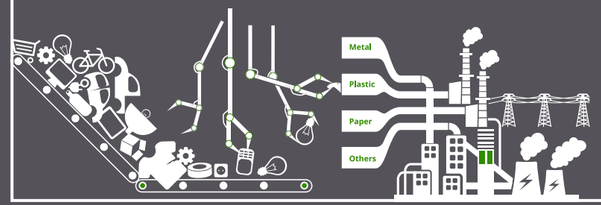
INNOVATION
SNIPPET

DISTRICT
SOUTH SIKKIM

STATE
SIKKIM

STUDENTS
- ANJILA GURUNG
- SHRUTI PRASAD

MENTOR
PURAN KARKI



> The idea was to harness the energy of the flowing water in the drain to filter the dumped waste.

INNOVATION THAT SOLVES DRAINAGE ISSUES

It was on a regular day to school that 5-year-old student Shruti and Anjila of the Government Senior Secondary School in Yangang, South Sikkim, came across a drain in the neighbourhood. The sight of the mucky drain water flowing with all kinds of plastic, household waste and pollutants irked him.

When he became a part of the Atal Tinkering Lab, one of the first problems he wanted to address was cleaning drains.

Explaining the prototype of the project, Shruti says, "Our idea was to harness the energy of the flowing water in the drain in a manner that would filter the dumped waste. What we built is a turbine that rotates in the drain. The turbine is attached to a conveyor belt that helps collect waste and further push it into larger containers/waste bins."

When asked about their experience working with ATL and interacting with experts, Shruti added, "When we first presented our project at the incubation centre, we received critical feedback from scientists and experts on how the mechanics could be improved to make the prototype effective. Thanks to the exposure that ATL provided we are now working on a new and improved model where we will also incorporate the use of solar panels and harness the power of the sun to increase the speed of the turbine."

> **We belong to a hilly area in Sikkim where even online e-commerce platforms find it difficult to deliver products. Amidst a scenario like this, where access to resources is always a problem, ATL provided the students of our school with some of the most important equipment they need to turn the model that only existed on paper into a prototype," says Puran Karki, the team's mentor.**

KENDRIYA VIDYALAYA CRPF AVADI

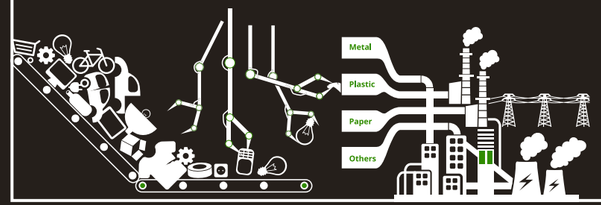
INNOVATION
UDJAN

DISTRICT
CHENNAI

STATE
TAMIL NADU

STUDENTS
- LOKHAWARSHNI
- SANTHIYA
- MUZEEBHA

MENTOR
KUMAR S



> The team collected raw sewage water and purified it, then hydrolysed it using a solar panel.

SEWAGE WATER TO SOLVE MULTIPLE ISSUE

Climate change is a serious threat. While there are several factors that are leading to it, one of the primary reasons is the pollution caused by oil-fueled vehicles.

Naturally, alternative fuels are all the rage as a solution to this issue. Everything from electricity to different kinds of fuel are commonly considered. And among those many options for alternative fuels, Hydrogen is a leading contender. Also, cars powered by Hydrogen release water vapour as exhaust. So that's a great plus.

"But the challenge is to produce Hydrogen cost-effectively," says Lokhawarshni from Kendriya Vidyalaya CRPF Avadi, Chennai. He and his team have innovated a unique solution for generating the gas.

To look at things from outside the box - another issue that plagues India is a huge amount of raw sewage. The team thought they should use that to their advantage. The idea was to extract hydrogen gas from sewage water.

The team first collected raw sewage water and purified it. Then, they hydrolysed the purified sewage water using a solar panel and segregated hydrogen and oxygen molecules. The separated gas was then collected in a balloon.

"As our innovation is just a prototype right now, collecting the little hydrogen gas created in a balloon is fine. But one it scales up, another solution will have to be found," says Lokhawarshni.

"Hopefully, innovations like ours we will make sure our country is pollution-free soon!" adds Lokhawarshni, signing off on a positive note.

“No, it is a very interesting number, it is the smallest number expressible as a sum of two cubes in two different ways.”

- Srinivasa Ramanujan

WATER CONSERVATION & MANAGEMENT

ZILA SCHOOL GAYA

INNOVATION
DEW AND AIR WATER GENERATOR

DISTRICT
GAYA

STATE
BIHAR

STUDENTS
- SHREYA SINHA
- PREM SAGAR
- PRITAM KUMAR

MENTOR
DEVENDRA SINGH

16-year-old students are turning air into water with 'Dew And Air Water Generator'.

STUDENTS TURN AIR INTO WATER WITH THEIR INNOVATION

Innovation truly matters when used for the larger good, and in our case, it was to fulfil a basic necessity," says 16-year-old Shreya Sinha, Zila School, Gaya.

The availability of clean drinking water is a huge problem in Gaya, Bihar. It is one of the most prominent issues that residents have to battle every day. Shreya wanted to do something to bring about change in this battle.

That idea, shaped into reality with a team and with the help of teachers, is the 'Dew and Air Water Generator'.

She, along with Prem Sagar and Pritam Kumar, spent months to create a successful prototype that can harvest water vapour from air.

Explaining the mechanism, Shreya adds, "Water is available all around us, if not in liquid form, then in other forms. So, with our device, we are collecting dew and moisture from the air to convert it into water."

This water is then purified and converted into potable water. Depending on the temperature, the best source generates water. For instance, during the winters, morning dew is used, while during summers, the moisture in the atmosphere is used.

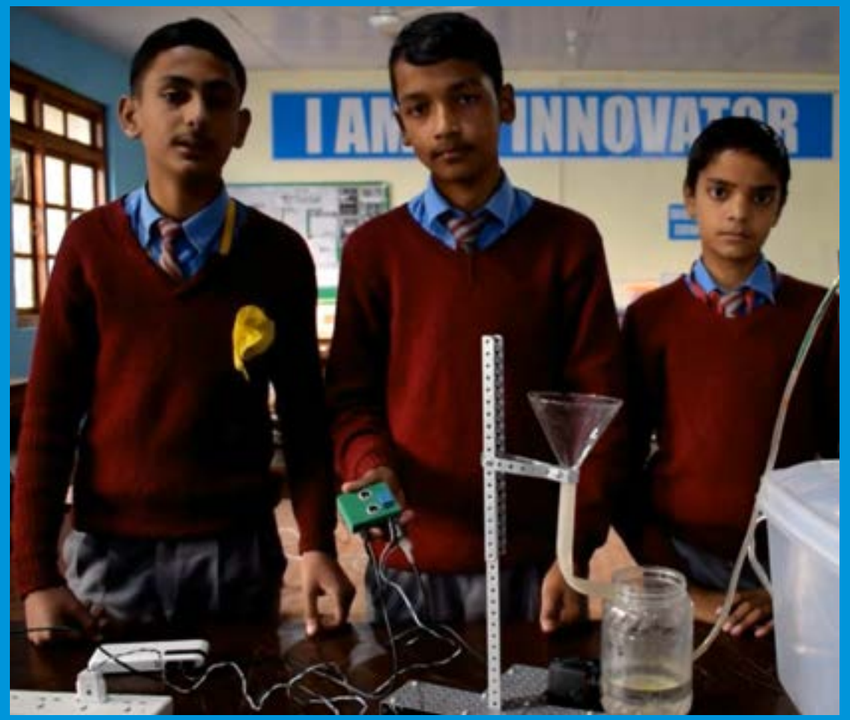
At this stage, the device takes an hour to produce one litre of purified drinking water. With better tech and research, the team hopes to make it more efficient by increasing the capacity so that more water can be produced in lesser time.

The team further plans to improve the prototype by making it solar powered.

"When living in close quarters with the issues plaguing society, one tends to look for solutions to these everyday problems. This is one such solution, and I hope it will be able to help society at large," says Shreya.

"Ideas come to thousands of children regularly, but how many of those materialise? Sometimes, it's because of the lack of proper guidance, but most of the time, it's because of lack of proper amenities. Our idea too would have been lost if not for the ATL Tinkering Lab. It has not only created an avenue to express our ideas but has also given us every possible support to turn an idea into a reality!"

GOVT. SR. SEC. SCHOOL CHAUNTRA



INNOVATION
SMART WATER-PUMPING SYSTEM

DISTRICT
MANDI

STATE
HIMACHAL PRADESH

STUDENTS
- NITESH
- SULABH THAKUR
- KAPIL SOOD

MENTOR
SANDEEP VERMA

SAVE EVERY DROP OF WATER, THESE STUDENTS SHOW HOW

> The team made smart water pumping device which uses an ultrasonic sensor to check the water level.

In many parts of rural Himachal Pradesh, 24x7 water supply is a far fetched dream. Water tends t grace many household taps just once a day and sometimes only once in two days.

Adults tend to wake up early in the morning to ensure that this water fills tanks, so all household water needs are met.

And yet, it is also a common sight to see overflowing tanks, who owners have left water taps open and unattended.

"When the Atal Tinkering Lab started in our school, we brainstormed together to find a solution to this problem. That is how my teammates, Sulabh, Kapil and I decided to innovate a smart water pumping system called Swajal Dhara," says Nitesh, a Class 9 student from the Government Senior Secondary School Chauntra, Mandi, Himachal Pradesh.

Here is the basic problem Nitesh and his team wanted to solve - early in the morning, when water is supplied, people send the water directly to a tank placed on the ground floor. They then switch on a water pump to lift it to a secondary tank on the roof. The need is to optimize the process to fill both time in shortest possible time.

Somebody has to be on constant watch for two or three hours. That person has to ensure the roof tank does not overflow and also keep an eye out that the water level in the ground floor tank does not drop so drastically that the pump runs 'dry. The former wastes water and electricity, and the latter damages the pump as well.

This needs presence of one individual every time the tanks are getting full.

"Our prototype is a smart water pumping device which uses an ultrasonic sensor that checks the water level in the tank placed on the ground floor. When the water level in this tank reaches the maximum level, the device will automatically switch the water pump on to direct the water to the upper tank. Once the exercise is complete, it will switch off the water pump automatically," says Nitesh.

A simple idea, but one that has the potential to save millions of liters of water across the nation!

"ATL gave us the confidence to learn about the latest technologies and utilize it to tackle everyday issues. We are now using tech for social welfare. And that wouldn't have been possible without ATL," says Nitesh, signing off.

> **ATL has boosted our students' innovative spirit. Their interactions with the scientists, experts and startups pushed them to take crucial feedback, incorporate them and better their products. Today, there are open to newer perspectives, willing to brainstorm and work on newer features. They are not only growing and improving as innovators but also as confident individuals, who are always open to learning. If you enter our ATL, you'll see them huddle together, sharing and noting the problems people in their immediate surroundings face and discuss prospective solutions. That to me, is exceptional. It wouldn't have been possible without ATL," says Sandeep Verma, the team's mentor.**

HONGIRANA SCHOOL OF EXCELLENCE

INNOVATION
POND E PLUS

DISTRICT/CITY
SHIMOGA

STATE
KARNATAKA

STUDENTS
- KOUSHIK U PAI
- PRADYUMNA P
- ANIRUDDHA

MENTOR
ROHITH V

> Pradyumna and his team came up with 'Pond E Plus' a boat designed to clean lakes.

BOAT THAT CLEANS WATER BODIES

We all like swimming in pools. But there is a certain emotion attached to swimming in a natural lake or pond. There is the open air, there is the closeness to nature and, of course, there is the wild and unrestrained aspect to it.

However, anyone who has swum in a natural lake will quickly realise there is one small issue - various things keep brushing your feet! Now, the natural wildlife - like crabs or fish - have every right to be in that lake.

But surprisingly, much of the problem comes from water weeds, which are actually deadly to natural lakes. They tend to grow wild, and will soon overgrow to such an extent that the lake itself will disappear.

A solution for water weeds is a much-needed innovation. And here is the team that has the innovation!

"My friends and I like swimming in lakes. During one swimming session in the Malnad region, we felt uncomfortable to swim as there were many underwater plants in the lake. When we discussed this with some locals who clean the lake, they told us that it was very difficult to remove those plants and clean the lake manually. That's when we decided to do something about it and came up with our innovation, the 'Pond E Plus'," says Pradyumna P from Hongirana School of Excellence, Shimoga, Karnataka.

The prototype that Pradyumna and his team came up with is a boat designed to clean lakes. A mechanical arm in the boat collects waste and dumps it in the waste collector in the boat.

The interesting part about the innovation is that the boat can be automatically controlled by a person with a mobile phone and can be operated with the help of Bluetooth and GPS connections.

Also, it is powered by solar energy and does not require any fuel to be operated.

"In the future, we are planning to add a water testing and a sanitary kit to our prototype," says Pradyumna, who hopes this simple idea will help kee lakes across India alive and lets his friends enjoy swimming!

ST. PAUL'S SCHOOL

INNOVATION
AQUASAVER

DISTRICT
DHARWAD

STATE
KARNATAKA

STUDENTS
- ROYSTON VEDAMUTHU
- SAGAR SHIVAYAPPAYANMATH
- AMNA BODLEKHAN

MENTOR
VEMA REDDY
KETHI REDDY

> The team made a device which detects the temperature of water in pipes and directly stores in underground tank.

UNIQUE DEVICE THAT SAVES WATER

Three students Royston, Sagar and Amna from St. Paul's School, Dharwad, Andhra Pradesh have devised a new solution for saving water. Almost in all the hotels & lodges unnecessary water is wasted every day. When an individual has to take a bath, one doesn't get hot water immediately. In order to get hot water, almost two buckets of water is wasted every day.

This does not make any sense when we are facing immense scarcity of water everywhere in our country. Royston shared his experience of a stay at a lodge which had 35 rooms altogether, and one bucket which contain 20 litres of water, and if two buckets of water is wasted by each room occupant, it equals to 370 gallons of water being wasted. As a matter of fact this is happening in almost all the lodges in our country.

The team visited various centres, facilities and lodges to understand and come up with a solution. These days there is a huge scarcity of water everywhere in the world. Therefore, using and saving water sensibly is good for the planet. Till now saving water is being overlooked by everyone.

The team came up with a device which detects the temperature of the water in pipes and is directly stored in underground tank from which water can be reused. The innovation is developed using microprocessors, 107 components, sensors and actuators.

The team wishes to incorporate the system into the plumbing system in buildings which are under construction and also for existing buildings.

CARDINAL HIGHER SECONDARY SCHOOL

INNOVATION
SALINE WATER TO SUSTAINABLE WATER

DISTRICT
ERNAKULAM

STATE
KERALA

STUDENTS
- BIJISHABIJO
- MILAN ELSA SHAJAN
- ANVYELSA THOMAS

MENTOR
MAMATHAK P

> This is a zero waste method for the generation of freshwater with very low TDS utilizing renewable energy from waste plastics.

SUSTAINABLE WATER FOR COASTAL COMMUNITY

Three students Bijisha, Milan and Anvy from Cardinal Higher Secondary School, Ernakulam, Kerala have designed a working prototype targeting sustainable water from saline water in coastal regions. This is a zero-waste method for the generation of fresh water with very low TDS utilizing renewable energy from waste plastics.

As per the statistics, the water scarcity in India is expected to worsen as the overall population is expected to increase to 1.6 billion by year 2050. There is an urgent need to utilize and leverage the available saline water.

Reverse Osmosis Membranes even with latest technology does not guarantee as a permanent solution to the problem of desalination without rejuvenations. The idea of integrated methodology of zero-waste fresh water generator utilizing energy from pyrolysis of plastics was incorporated. The introduced method is quite economical as compared to the conventional reverse osmosis method.

The team at present have developed only the membrane for the system, but in future they wish to make it a complete product using the membrane.

KENDRIYA VIDYALAYA NO.1, PALAKKAD

INNOVATION
RAIN WATER HARVESTING AND PURIFICATION

DISTRICT
PALAKKAD

STATE
KERALA

STUDENTS
- YAVVANA
- SNIGDHA

MENTOR
MRS. MONYK R

> The idea was to connect the rooftops of all houses in a street/ colony to a single tank to collects all rainwater.

INNOVATION THAT REDUCES WATER SCARCITY

Our country faces a major water crisis. Especially during summers, many of the cities and villages experience acute water scarcity. And tragically, even when it rains, it floods many times as uncaught, uncontrolled rain waters tend to accumulate in devastating fashion.

There are many issues and solutions that connect the lack of water in the country and the lack of proper use of the rainwater India gets in so much quantity every year.

However, the start of all changes has to be that first step, and in this case, the first step is innovation.

"When we were thinking of ways to find a solution to this issue, an idea occurred to us. What if we can save a maximum amount of rainwater during the monsoon season? Thus, we came up with our innovation - the 'Rainwater Harvesting System'," says Yavvana from Kendriya Vidyalaya No.1 School, Palakad.

The idea is to connect the rooftops of all the houses in a street or a colony to a single tank that collects all rainwater falling on the roofs. Later, the collected water is purified and distributed to every household in the colony.

Also, in certain villages where there are farms, the collected water can be supplied for irrigation purposes too. This inter-connected system also helps regulate rainwater indirectly, as water is diverted to tanks and natural ponds, instead of pouring out on the streets.

"In our current prototype, we are using an electric motor to supply water to these households. But in the future, we would like to use solar energy to operate the motor," says Yavvana.

But in a broader sense, Yavvana says he wants to see his system at work in the real world at scale.

"After all, if it makes a difference in one street also, it would be a start!" he adds.

KENDRIYA VIDAYALAYA BERHAMPUR

INNOVATION
POSEIDON

DISTRICT
GANJAM

STATE
ODISHA

STUDENTS
- P.BISWANATH PATRA
- SRITISH KUMAR GOUDA
- SWAYAMSHU MANDAL

MENTOR
SANTOSH KUMARPADHI

> The team created the prototype of a device that can dispense any fixed amount of liquid to any container.

FACING WATER CRISIS, THIS STUDENT STARTED INNOVATING FOR SOLUTION

"I live in an area where we face a perpetual water crisis. We get water in the morning at a time when my parents and I leave for work and school, respectively. And mostly, there's no one at home to turn the motor on," says P Bishwanath Patra, a Class 11 student from the ATL Tinkering Lab of Kendriya Vidyalaya Berhampur, Odisha.

"On the other hand, on my way to school, I often came across sights that agitated me. People who received water at convenient hours would leave the taps open, letting tanks overflow and clean water waste away into the drains. It irked me to see so many litres of water getting wasted, while my home did not have enough water for us to use every day. That led me to innovate Poseidon, a smart water dispenser," he shares.

P Nishwanath, along with his team Sritish Kumar Gouda and Swayamshu Mandal created the prototype of a device that can dispense any fixed amount of liquid to any container.

All one has to do is punch in the quantity of water one requires into the machine in litres. It will let the water source dispense the same amount of water and automatically stop the flow.

The previous version the team worked on was a submerged motor to control the flow of water from the storage tank. But after working with the ATL, they realised that such a version wouldn't be useful for different sources of water within a household - like for taps, for example.

The student developed a more compact version which has an electronic valve that controls the flow of water. It also has an extension into the primary water tank that monitors the flow of water. And so, not a drop of water is wasted.

> After visiting the ATL Incubation Centre in Hyderabad, we were able to get the required guidance from mentors and experts. All through the five-day programme, we had experts who trained us in various aspects of building a successful innovation from design thinking, patenting, aesthetic sense, leveraging funds etc. Thanks to this, today, we have managed to make it to the Top 50 of Innovation Marathon with a satisfiable product that we are proud of.

Success can come to you by courageous devotion to the task lying in front of you.

-C V Raman

ATAL INNOVATION MISSION WOULD LIKE TO THANK OUR **ESTEEMED PARTNERS** FOR THEIR SUPPORT TO THE ATL TINKERING INNOVATION MARATHON

ATAL INNOVATION MISSION WOULD LIKE TO THANK THE **ATAL INCUBATION CENTRES** WHO HAVE SUPPORTED THESE INNOVATORS WITH THE **STUDENT INNOVATOR PROGRAM**

BIG THANK YOU

Atal Innovation Mission, NITI Aayog would humbly like to thank all the contributors to the tinkering journey of student

Happy Tinkering

Empowering the individual means empowering the nation. And empowerment is best served through rapid economic growth with rapid social change.

-Shri Atal Bihari Vajpayee

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