STI HUB

A Project for the Society Executed by Chitkara University, Punjab

CHITKARA UNIVERSITY

Science Technology and Innovation Hub (STI Hub)
District Patiala, Rajpura Block
Chitkara University, Punjab, India

[A Project of 1.82 Crore sanctioned by Ministry of Science and Technology, Govt. of India under DST-CEED]

<u>Introduction</u>

Science, Technology, and Innovation Hub is aimed to improve the socio-economic conditions of concerned population through various interventions. STI-HUB at Chitkara University is working to improve the socio-economic conditions of ST (Scheduled Caste) community in district Patiala, Rajpura Block. In pursuit of this objective, the university focused on **four distinct areas: making healthcare more affordable, promoting water awareness, implementing the Internet of Things in agriculture and animal husbandry, and incorporating augmented/virtual reality in education.**

Within the realm of affordable healthcare, a remote diagnosis system called E-Dispensary has been created. This system links patients residing in remote areas with specialized doctors. As a result of this initiative, 41 health-related activities were carried out, providing health benefits to over 495 beneficiaries.

The second vertical was emphasized on disseminating awareness on how to purify drinking water. Impure drinking and agriculture water is a major concern in rural areas of district Patiala. Raising awareness, conducting timely tests on water bodies and sources, and devising inexpensive filtration units can effectively address the issue of water pollution. Under this vertical one prototype named Swach Neer was developed using rice husk ash. *Swach Neer* is a specialized earthen pot for purifying water.

The third sector employs the Internet of Things to enhance productivity in agriculture and promote sustainable milk production. University also signed an MoU with IMD (India Meteorological Department) to disseminate timely weather information in a regional language to beneficiaries.

Equity and access in primary and secondary education is a major concern in this district. Another problem is the engagement of students in the classes and schools. Under the fourth vertical, beneficiaries were taught through AR/VR technologies to resolve these issues. Every vertical is mapped with a sustainable development goal adopted by the United Nations.

First Vertical: Affordable Healthcare

Introduction: Though affordable healthcare is a basic entitlement for all, it remains a hurdle for millions worldwide. Steep healthcare expenses can lead to financial strain, restrict vital medical services, and cause insufficient care or even bankruptcy. Accessible healthcare is vital for fostering community health and well-being, making it a worldwide priority to enhance public health results.

Accessible healthcare at reasonable costs holds immense significance, notably in developing nations where economic, social, and infrastructure limitations frequently restrict quality healthcare access. Within these regions, the absence of affordable healthcare can lead to avoidable fatalities and illnesses, prolonging poverty cycles and impeding socio-economic progress. Nevertheless, in well-developed nations with strong healthcare systems, the affordability issue persists

for numerous individuals and families, particularly those with lower incomes or limited insurance coverage.
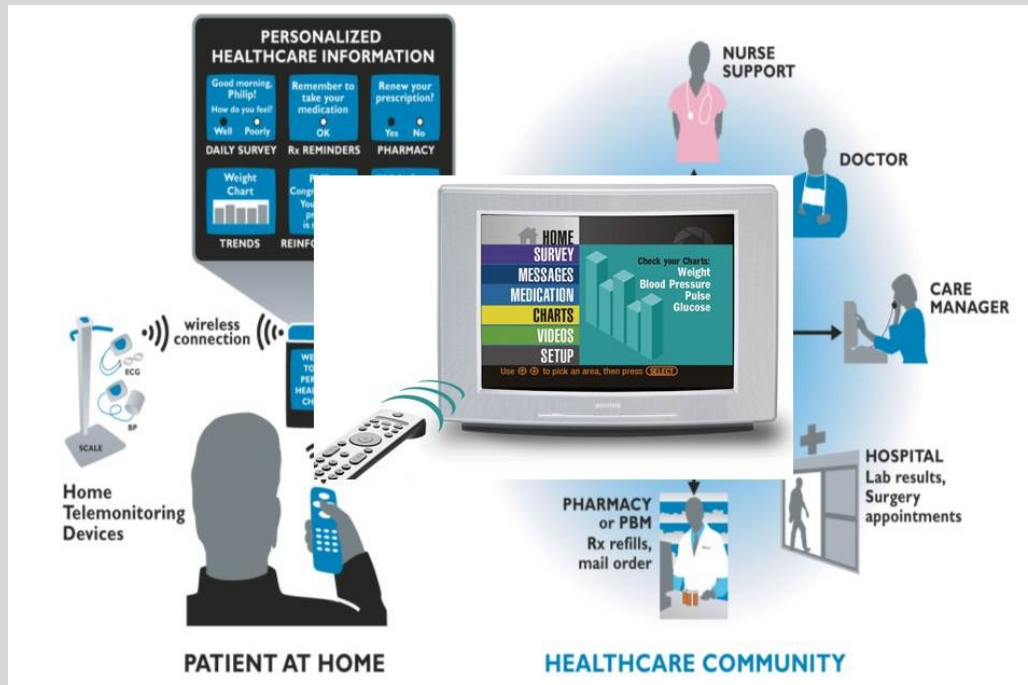

Figure 1. Home Telemonitoring

There are several key factors that contribute to the challenge of healthcare affordability. These include the rising costs of medical care, including hospitalization, prescription drugs, and medical technologies, as well as the increasing burden of chronic diseases and lifestyle-related health issues. Additionally, inadequate coverage from comprehensive health insurance, limited healthcare infrastructure in specific areas, and socioeconomic inequalities exacerbate the issue.".

key strategies for healthcare

Achieving affordable healthcare requires multi-faceted approaches and collaborations among governments, healthcare providers, insurance companies, and other stakeholders. The following are some crucial tactics that should be used to increase healthcare accessibility and affordability for everyone.

a) **Universal Health Coverage:** One of the most important steps in obtaining cheap healthcare is the implementation of universal health coverage, where all people have access to necessary medical services without having to worry about their finances. Governments can design and implement health insurance programs that cover the entire population or specific vulnerable groups, and ensure that the coverage is comprehensive and affordable, with affordable premiums, co-pays, and deductibles.
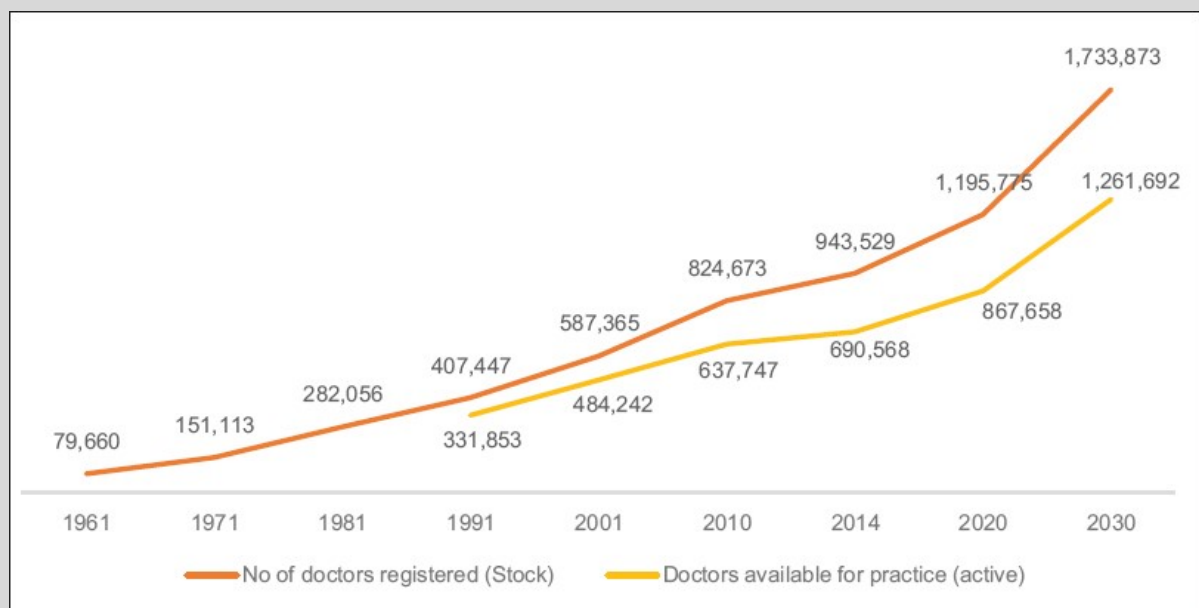
Figure 2. Number of doctors registered and active from 1961-2030 in India

b) **Cost-Effective Healthcare Delivery Models:** Adopting cost-effective healthcare delivery models, such as primary care-based approaches, community health clinics, and telemedicine, can help reduce the overall cost of healthcare while maintaining quality care. These models emphasize preventive care, early diagnosis, and management of diseases, and can be particularly effective in underserved areas or remote regions where access to healthcare is limited.

c) **Price Transparency and Regulation:** Encouraging competition among healthcare providers can lead to lower costs by empowering patients to make educated decisions and ensuring pricing transparency in healthcare

services, prescription medications, and medical devices. Furthermore, government rules aimed at regulating the costs of pharmaceuticals, medical services, and technology can stop price gouging and lower the cost of healthcare.

d) **Investment in Public Health and Prevention:** Investing in public health and prevention measures, such as health education, promotion of healthy lifestyles, and early detection and management of diseases, can reduce the need for expensive medical interventions and long-term healthcare costs. Prevention is not only cost-effective but also promotes overall health and well-being.

e) **Innovation and Technology:** Harnessing innovation and technology, such as telemedicine, electronic health records, and digital health solutions, can improve healthcare efficiency, reduce costs, and increase access to healthcare services, particularly in remote areas or underserved communities.

f) **Collaboration and Partnerships:** Collaborations among governments, healthcare providers, insurance companies, and other stakeholders are crucial to address the complex issue of healthcare affordability. Public-private partnerships, community collaborations, and global health initiatives can leverage collective efforts and resources to drive sustainable solutions.

Second Vertical: Internet of Things (IoT) in agriculture

Introduction: The Internet of Things (IoT) refers to a network of physical objects, devices, vehicles, and other items embedded with sensors, software, and network connectivity that enables them to exchange data and interact with each other over the Internet. The objects in the IoT network can range from simple devices such as sensors and thermostats to complex systems such as self-driving cars and smart cities. The IoT network allows for the collection of real-time data from a wide

range of sources, which can be analysed to improve efficiency, productivity, and decision-making. The data collected from the IoT network can be used to monitor and control physical systems, optimize resource usage, and improve overall performance.

The IoT is often described as the "third wave" of the internet, following the initial wave of communication and the second wave of information sharing. The IoT has the potential to transform many industries, from agriculture and manufacturing to healthcare and transportation, by providing real-time data and insights that can be used to improve efficiency and productivity.

The Internet of Things (IoT) has significant potential to revolutionize agriculture by enabling farmers to collect and analyze data from their farms in real-time, making it easier to optimize crop yields, conserve resources, and increase profitability. Likewise, The Internet of Things (IoT) can play a significant role in animal husbandry by providing farmers with real-time data and insights on animal health and behaviour. Overall, IoT has the potential to help farmers improve animal welfare, reduce costs, and increase productivity. By providing real-time data and insights, IoT can help farmers make informed decisions that lead to better outcomes for both animals and farmers.

With the exponential growth of world population, according to the UN Food and Agriculture Organization, the world will need to produce 70% more food in 2050, shrinking agricultural lands, and depletion of finite natural resources, the need to enhance farm yield has become critical. Limited availability of natural resources such as fresh water and arable land along with slowing yield trends in several staple crops, have further aggravated the problem. Another impeding concern over the farming industry is the shifting structure of the agricultural workforce. Moreover, agricultural labor in most of the countries has declined. As a result of the declining agricultural workforce, adoption of internet connectivity solutions in farming practices has been triggered, to reduce the need for manual labor.

IoT solutions are focused on helping farmers close the supply-demand gap, by ensuring high yields, profitability, and protection of the environment. The approach of using IoT technology to ensure optimum application of resources to achieve high crop yields and reduce operational costs is called precision agriculture. IoT in agriculture technologies comprise specialized equipment, wireless connectivity, software and IT services.

BI Intelligence survey expects that the adoption of IoT devices in the agriculture industry will reach 75 million in 2020, growing 20% annually. At the same time, the global smart agriculture market size is expected to triple by 2025, reaching $15.3 billion (compared to being slightly over $5 billion back in 2016).

Smart farming based on IoT technologies enables growers and farmers to reduce waste and enhance productivity ranging from the quantity of fertilizer utilized to the number of journeys the farm vehicles have made, and enabling efficient utilization of resources such as water, electricity, etc. IoT smart farming solutions is a system that is built for monitoring the crop field with the help of sensors (light, humidity, temperature, soil moisture, crop health, etc.) and automating the irrigation system. The farmers can monitor the field conditions from anywhere. They can also select between manual and automated options for taking necessary actions based on this data. For example, if the soil moisture level decreases, the farmer can deploy sensors to start the irrigation. Smart farming is highly efficient when compared with the conventional approach [3].

IoT based weather forecasting devices can also play vital role to help farmers to take timely decisions. One such device is made under this project, and we named it as "BHUGOL". It is a smart device which collects signals from DISH TV and then based on the cloud density and distance, it predicts the rainfall. Such timely information can help farmers to make time decisions like when to spray pesticides, urea, sowing seed, and irrigation.
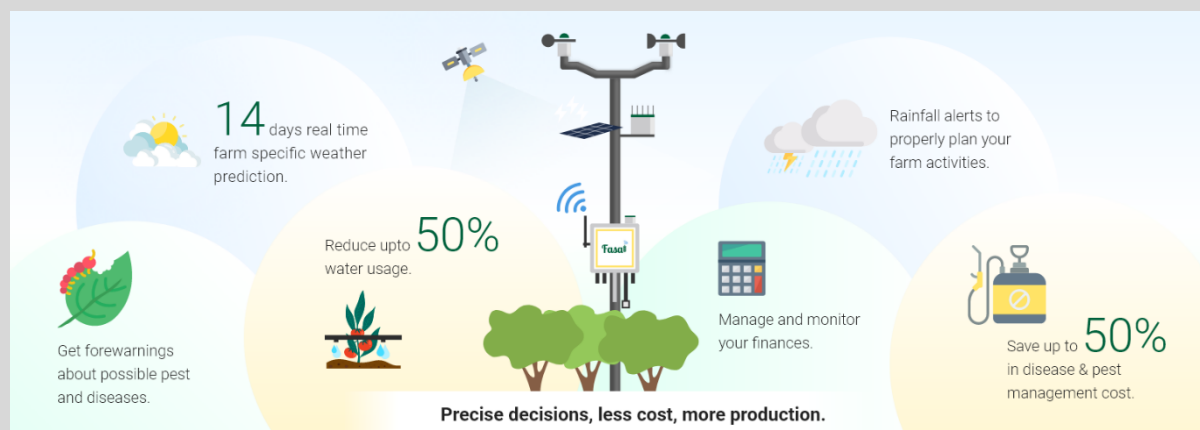
Figure 3. Usage of IoT-based weather forecasting in farming

Different ways through which weather forecasting significantly influences agriculture:

Weather forecasting plays a crucial role in agriculture as it helps farmers make informed decisions about planting, harvesting, and managing their crops. Here are some of the ways in which weather forecasting impacts agriculture:

a) **Planting and harvesting decisions:** Farmers need to know the weather forecast before they plant their crops or harvest them. They need to know if there is going to be a period of dry weather or heavy rainfall, as this can affect the growth and yield of the crops. For example, if there is going to be a prolonged dry spell, farmers might delay planting until there is enough moisture in the soil.

b) **Irrigation scheduling**: Farmers use weather forecasts to determine when to irrigate their crops. If there is going to be a period of heavy rainfall, they might delay irrigating their crops. On the other hand, if there is going to be a prolonged dry spell, they might increase the frequency of irrigation.

c) **Pest and disease management:** Weather forecasts can help farmers manage pests and diseases. For example, if there is going to be a period of heavy rainfall, farmers can anticipate an increase in the population of certain pests and take measures to control them.

d) **Crop protection:** Weather forecasts can also help farmers protect their crops from damage due to extreme weather events such as storms, hail, or

frost. They can take preventive measures such as covering the crops or harvesting them before the weather event occurs.
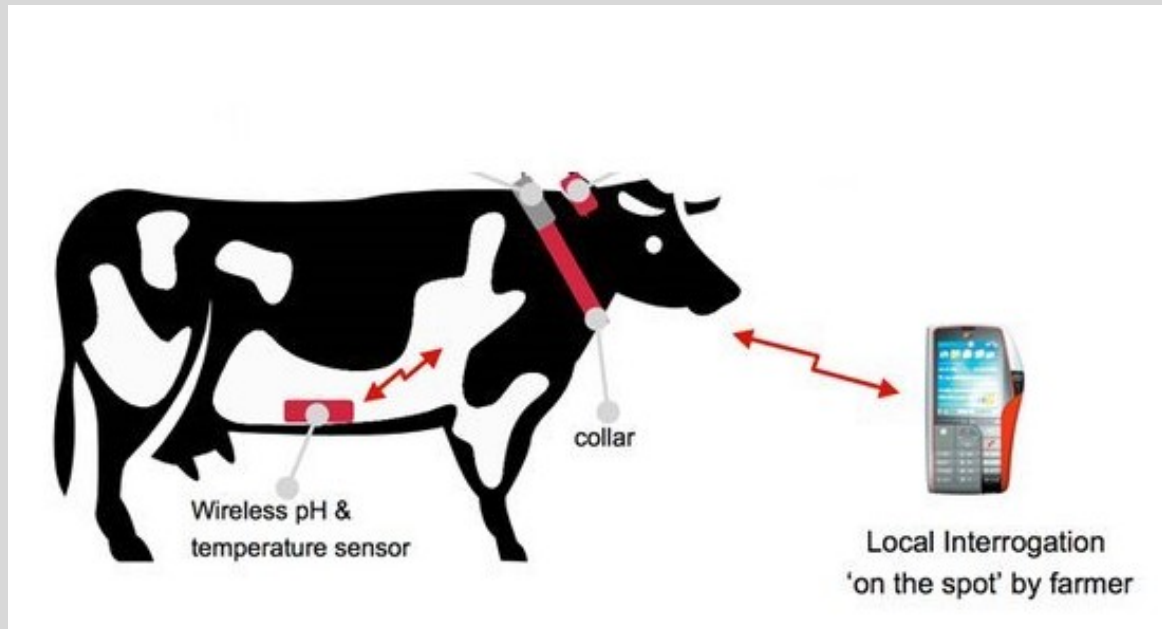
Figure 4. IoT-based cattle body temperature monitoring

e) The body temperature of a cow can have a significant impact on milk production. Here's how:

f) Optimal body temperature: Cows are most comfortable and produce the most milk when their body temperature is within a specific range. The ideal body temperature for a cow is between 101.5°F and 103.5°F (38.5°C and 39.7°C). When the cow's body temperature goes above or below this range, it can cause stress, reduce feed intake, and lead to a decrease in milk production.

g) Heat stress: When cows are exposed to high temperatures, their body temperature can increase, leading to heat stress. Heat stress can cause reduced feed intake, dehydration, and an increase in respiration rate, which can result in a decrease in milk production. Therefore, it is essential to take measures to prevent heat stress in cows, such as providing access to shade, cooling fans, and misters.

Illness: When cows are sick, their body temperature can increase because of inflammation or infection. A high body temperature due to illness can lead to a decrease in milk production. It is important to monitor cow body temperature regularly to detect and treat illnesses promptly.

Reproduction: The body temperature of a cow can also impact reproduction. High body temperature can affect the cow's oestrus cycle, reduce fertility, and increase the risk of embryonic loss.

In summary, the body temperature of a cow plays a crucial role in milk production. Maintaining optimal body temperature, preventing heat stress, detecting and treating illnesses promptly, and managing reproduction can all contribute to maximizing milk production in dairy cows.

Third Vertical: Water Management

Introduction: Water pollution, also known as aquatic pollution, is the contamination of water bodies, typically brought on by human activity, which has a detrimental impact on the uses of the water. Aquifers, reservoirs, lakes, rivers, seas, and groundwater are all examples of bodies of water. As toxins get into these bodies of water, contamination occurs. Sewage discharges, industrial activities, agricultural activities, and urban runoff including stormwater are the four main sources of contaminants. Surface water pollution and groundwater pollution are both types of water pollution. When people use contaminated water for irrigation or drinking, it can cause a variety of issues, including the destruction of aquatic ecosystems and the spread of diseases that are transmitted through the water. Water pollution also reduces the ecological services that the water resource would otherwise supply, such as the provision of drinking water.

There are two types of sources of water pollution: point sources and non-point sources. Point sources, such a storm drain, a wastewater treatment facility, or an oil spill, have a single, distinguishable cause. More widespread non-point sources include agricultural runoff. The cumulative effect over time leads to pollution. Oil, metals, plastics, pesticides, persistent organic pollutants, industrial waste

products, pH changes, elevated temperatures, excessive turbidity, salinity changes, and the entrance of pathogenic organisms are only a few examples of harmful chemicals that can cause pollution. Both organic and inorganic compounds might be contaminants. The use of water as a coolant by industrial enterprises and power plants is a frequent contributor to thermal pollution. Adequate management strategies, infrastructure, and legislation are all necessary for the control of water pollution. The use of technology can help with sanitation, sewage treatment, agricultural wastewater treatment, industrial wastewater treatment, erosion control, sediment control, and urban runoff control (including stormwater management).

Ground Water Pollution:

When contaminants are released into the air or ground and find their way into groundwater, this is referred to as groundwater pollution or groundwater contamination. This kind of water pollution can also happen naturally as a result of a tiny and unwelcome element, contaminant, or impurity in the groundwater; in this case, contamination is more appropriate than pollution. Groundwater contamination can be brought on by onsite sewage systems, landfill leachate, wastewater treatment plant effluent, leaking sewers, gas stations, hydraulic fracturing (fracking), or excessive fertiliser use in agriculture. Natural pollutants like arsenic or fluoride can also cause pollution (or contamination). Utilizing contaminated groundwater puts the general people at risk for illness or poisoning (water-borne diseases).

An aquifer frequently develops a contamination plume as a result of the pollutant. The pollution is dispersed across a larger area by water movement and dispersion inside the aquifer. Its expanding boundary, frequently referred to as a plume edge, can collide with surface water sources like seeps and springs and groundwater wells, rendering the water dangerous for both people and wildlife to drink. A hydrological transport model or a groundwater model may be used to examine the plume's movement, known as the plume front. The analysis of

groundwater pollution may concentrate on the geology, hydrology, hydrogeology, and hydrology of the location as well as the nature of the contaminants. Pollutants can be transported by a variety of mechanisms, including diffusion, adsorption, precipitation, degradation, and groundwater.
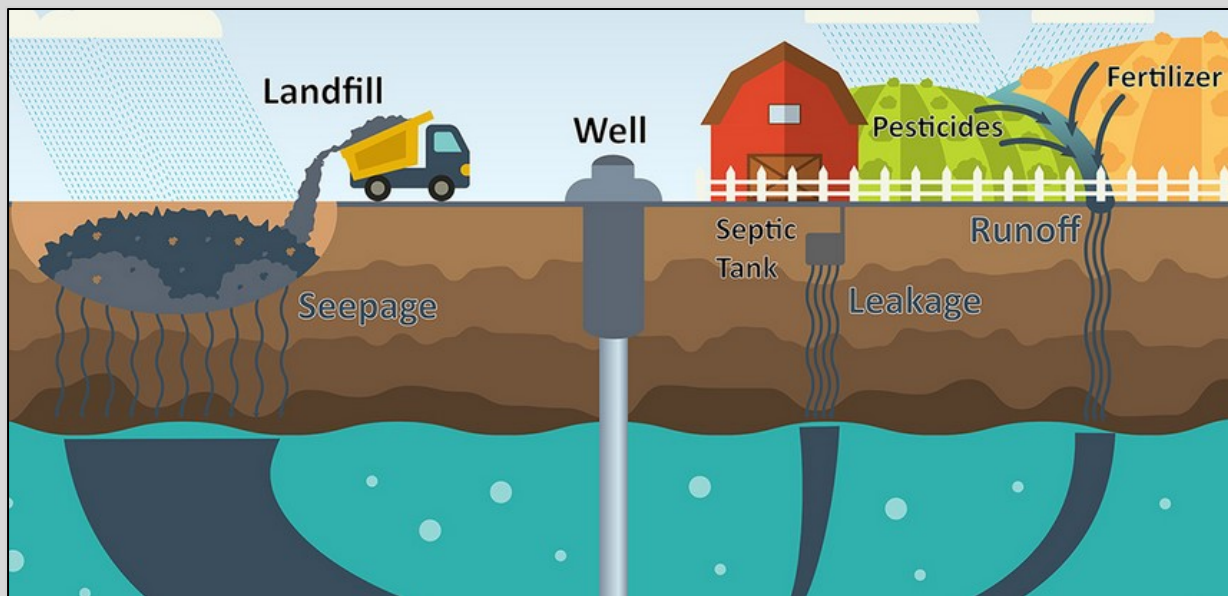
Figure 5 Ground Water Contamination

Using hydrological transport models, the relationship between groundwater contamination and surface waters is investigated. Complex interactions exist between surface water and groundwater. For instance, groundwater supplies a number of rivers and lakes. As a result, harm to groundwater aquifers, such as that caused by fracking or excessive extraction, may have an impact on the rivers and lakes that rely on it. Such interactions include saltwater intrusion into coastal aquifers. The precautionary principle, groundwater quality monitoring, groundwater protection land zoning, correctly situating on-site sanitation systems, and the use of laws are all examples of prevention approaches. Point-of-use water treatment, groundwater remediation, and, as a last option, abandonment are some of the management strategies used when pollution has occurred.

Effects of Fluoride on human health

Consuming toxic fluoride water causes adverse health hazards. Fluoride effects on the brain, thyroid, chronic joint pain, arthritis, permanent damage the tooth enamel. Even heavy consumption of fluoride water for long duration makes human bones strikes, makes unable to stand or walk. Consumption of fluoride water increases the probability of Increased tumor and cancer rate. Lower IQ in the children, muscle disorders, disrupted immune system, damaged sperm and increased infertility are commonly affected by the fluoride.

Figure 6 Side effects of fluoride on human beings

Causes of water pollution:

Causes of groundwater pollution include the following:

- Naturally occurring (geogenic)
- On-site sanitation systems
- Sewage and sewage sludge
- Fertilizers and pesticides
- Commercial and industrial leaks
- Hydraulic fracturing
- Landfill leachate

<u>Fourth Vertical: Augmented Reality (AR)/Virtual Reality (VR) in Education</u>

Introduction: Due to their innovative ways of enhancing student engagement and improving the learning environment, virtual reality (VR) and augmented reality (AR) are completely changing the field of education. Beyond traditional teaching methods, these technologies offer immersive and interactive learning environments that suit different learning styles. New avenues for superimposing digital data on the actual world have been opened up by the use of augmented reality (AR) to provide instructional information. When historical artefacts are pointed at by students with their devices, relevant information is instantly retrieved, allowing them to investigate bygone civilizations. This is the kind of technology that might one day allow students to bring history to life. Because it provides a more dynamic and engaging learning environment, this augmentation of reality improves lessons. But with virtual reality (VR), students are immersed in completely virtual environments, creating a sense of presence that transcends traditional classroom settings. One way to help students study and interact with the subject as if they were in person is through virtual field trips, which transport them to historical events or far-off locations. Because it provides students with experiences they wouldn't otherwise have, this is especially beneficial for remote or low-income institutions. Virtual Reality (VR) and Augmented Reality (AR) are also transforming education in complicated areas. Students can explore the human body or engage with three-dimensional representations of molecules in scientific classes, for example, in ways that are not possible with traditional textbooks. Making abstract concepts more tangible through the ability to work with and alter these models enhances understanding and memory. Similar to this, by turning abstract equations into interactive, visual experiences, virtual environments in mathematics might help students grasp mathematical concepts more thoroughly. Immersive technologies are used in various domains which are described in Figure7.
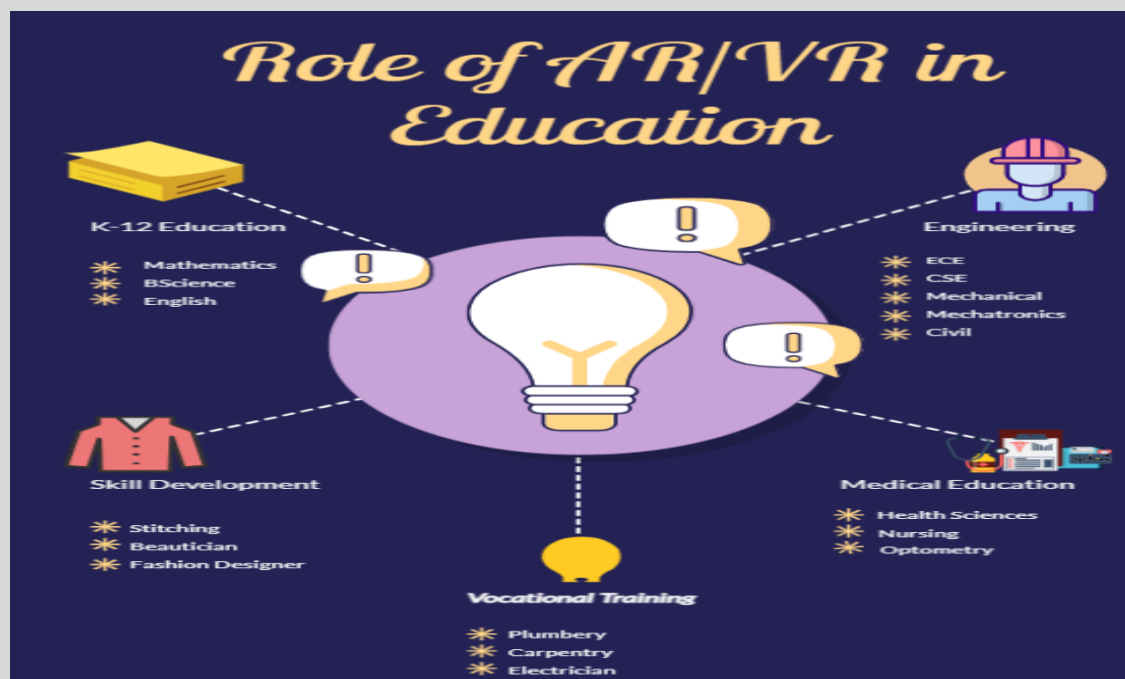
Figure 7. Role of AR/VR in Education

One of AR and VR's greatest advantages in the realm of education is its capacity to satisfy the individual learning needs of every learner. By tailoring the content to each learner's interests and speed, learning experiences can be made more adaptive through the usage of these technologies. By using AR and VR to create customised simulations, interactive assessments, or flexible courses, educators may better address the unique needs of a diverse student body. This promotes a friendlier and more effective learning atmosphere. AR and VR are having a big impact on language acquisition outside of traditional classroom settings. Virtual language immersion experiences help students develop and refine their language skills by simulating real-world situations. With virtual native speakers, students can interact more dynamically and engagingly than in traditional language labs or textbooks. They can also tour culturally diverse settings and acquire useful language skills. Collaborative learning is another area where AR and VR shine. These technologies enable the creation of virtual classrooms, where students can collaborate on projects, share ideas, and take part in group activities exactly as they would if they were in the same physical space. This global approach not only

prepares students for an increasingly interconnected world, but it also encourages cooperative skills and cross-cultural understanding. The importance of augmented reality (AR) and virtual reality (VR) in skill development cannot be overstated. These innovations are transforming many sectors of the economy and provide unique advantages that significantly enhance education. The key elements that highlight the application of AR and VR in skill development are as follows.

Augmented reality (AR) and virtual reality (VR) are transforming skill development in trades like carpentry, plumbing, and electrical work with their immersive and engaging training environments. By providing students with realistic simulations and practical experience in a secure virtual setting, these technologies help students close the knowledge gap between theory and practical application.

Traditional construction industry training methods are being transformed by AR and VR. Apprentices and students can participate in virtual workshops where they control digital tools and materials to hone their woodworking skills without having to worry about being hurt or wasting materials. Students can develop competence and confidence by practising measuring, cutting, and assembling various components in these lifelike simulations of real-world scenarios before starting actual projects. In the virtual environment, users can also experiment with different tools, joinery techniques, and woodworking processes, expanding their knowledge beyond what could be achievable in a traditional classroom setting.

AR and VR in the plumbing industry allow students to comprehend complex systems and procedures in a more comprehensible manner. By employing virtual simulations that can replicate plumbing installations, students may diagnose and fix digital plumbing systems before working on actual ones. They can see different types of pipes, fittings, and fixtures, practise problem-solving strategies,

and understand the principles of water flow in a risk-free environment. Students are guaranteed to have a deep understanding of plumbing fundamentals and are better prepared to manage any challenges they may encounter in real-world settings because AR and VR are participatory learning tools.

For talent development in the electrical industry, AR and VR offer a dynamic platform. Electricians have the ability to interact with electrical parts, wiring diagrams, and circuits by means of virtual environments. Students can practice skills like circuit design, installation, and troubleshooting without running the danger of working with actual electrical systems by using these simulators. Learners can improve their readiness for practical electrical work by receiving hands-on experience in problem-solving methods, safety protocols, and electrical identification.

One of the primary uses of AR and VR in skill development is customization of training programmes to meet the demands of particular learners. The freedom to go at their own pace allows students to revisit challenging material until they have mastered it. Because of the adaptability of these technologies, learning materials may be tailored to the different learning styles and speeds of individuals who want to work in carpentry, plumbing, or electrical.

DIFFERENT ACTIVITIES CONDUCTED UNDER THE PROJECT

1st Year Activities

Awareness and data collection on water testing was done on 6th Nov, 2020 in Village Jhansla. The activity was based on awareness on water testing and 45 Women and children were shown simple water tests and their significance. It was demonstrated in Gurdwara of Jhansla village.

Installation of sanitizer machine Dr. Naveen Kumar and Dr. Rajesh Kumar Kaushal of Chitkara University, Rajpura, Punjab visited the village Bathonian of district Patiala on **26th December 2020** to donate a sanitizing machine under the Science Technology and Innovation Hub and DST CAWACH program

Health check-up camp and awareness about calcium deficiency disease among women (27th & 28th November 2020). An eye examination camp was organized under the banner of STI-HUB, Chitkara University, Punjab for the SC community staff members on 27th & 28th November 2020. The main objective was to provide fee medical assistance to such people. The camp was organized with the help of the department of health sciences. The camp was setup on the 3rd and 4th floor of Galileo Block, Chitkara

	University. According to the beneficiaries, this camp was really useful as it makes them aware of the health status of their eyes.
	Water Management on 2020, Dec 26th at Chitkara University Half Day awareness and demonstration of water testing was conducted in STI HUB, Chitkara University. 42 youth learnt to conduct simple water tests and explained how to interpret the test results.
	Interaction and Survey The Augmented and Virtual Reality team from Chitkara University Punjab, visited the village Fatehpur Garhi on **January 09, 2021.** Dr Bhanu Sharma, Ms. Dimpal Nagpal (Project assistant) and Ms. Shanu (Research Scholar) interacted with the villagers belonging to the scheduled caste community about the importance education and health for women. The team approached Mrs. Indira Rani, for this event. From his team Mr. Jagdish guided the university team to the Gurdwara Sahib where she arranged a meeting of the team with the village people. The team explored that most of the village women were illiterate. But the children were even aware of the mobile games. The STI team installed the sanitizer machine at Gurdwara Sahib and distributed disinfectants among the villagers.

Data collection and awareness on 2021, Jan 19th. Awareness on safe and clean drinking water was conducted Angandwadi Centre of Mohi Kurd. 42 children and their parents were invited to showcase the importance of clean drinking water and small children were given tips of drinking water in play way manner.

Water Testing Requirement in 2021, Jan 21st. A training on water testing was provided to the STI HUB beneficiaries- gardeners of Chitkara University by Dr Jyotsna Kaushal, Ajay Singh and Shalini. It was conducted on Jan.21, 2021 at STI HUB, Center for water sciences in the Chitkara University. They learned and self-tested the water of Chitkara University.

Awareness on online Learning Platform on 2021, Jan 30th. The Augmented and Virtual Reality vertical team visited the school in Shamdoo. Dr Bhanu Sharma interacted with the students and teachers about the importance of education and online learning platforms. The team approached Mrs. Varsha Rani for this event. School children were very curious about new technologies. They learned and experienced the online learning portals provided by Govt. of India. School teachers also actively participated in the activity.

Health Camp for Women and Children of Thua Village in 2021, Feb 6th. STI-HUB, Chitkara University, Punjab organized health camp and water awareness camp for the Women beneficiaries of Thua Village on 6th February 2021. The main objective was to make them aware about the water-saving techniques and the importance of health.

Awareness on Water Conservation **on 2021 Feb 16th,** Dr Jyotsna Kaushal and Ms Shalini interacted with the small kids of Anganwadi, Mohi Kurd. Children were explained the importance of conservation of water in play way method. They were also informed about the clean drinking water. Sarpanch and some parents also participated in discussion.

Awareness on water conservation on 2021 Feb 6th

A major event MAHILA SASHAKTI KARAN was conducted for STI beneficiaries especially for women of Thuha village on Feb. 06, 2021 and women were invited to the Chitkara University campus. Ladies and children were the participants in the Women Sashaktikaran event. Through games, videos and different activities were performed for the awareness on water conservation, agriculture practices. Health checkup was conducted for women in coordination with the Department of Health sciences.

Science for Fun on 2021, March 04th. Science for Fun was conducted by Dr Jyotsna Kaushal. Children from primary school, Pehar Kallan invited for exploring science through different experiments. Research scholars from Chitkara University interacted with children and teachers. From AR/VR Vertical, Dr. Bhanu Sharma interacted with children regarding importance of gamification in science education. Students were very excited after AR/VR experience.

Awareness on online Learning Platform and Educational Games using AR/VR on 2021, March 20th Chitkara University, STI-HUB team visited Mohi-Khurd Village of district Patiala on 20th March 2021 to spread awareness about role of IoT (Internet of Things) in agriculture, health awareness due to COVID-19 and improving learning outcomes through AR/VR (Augmented Reality/Virtual Reality) devices. The activity was exclusively scheduled for the SC (Scheduled Caste) community of the villagers. This activity was supervised by Dr. S.N.Panda, Dr. Rajesh Kumar Kaushal, Dr. Naveen Kumar, Dr. Bhanu Sharma, Shanu Bhardwaj and Mr. Kuldeep Singh. The glimpses of this activity are showcased below.

Education program on healthy diet plan and hazards of junk food on 2021, March 15th in Village Kalo Majra Various activities like weight, height, BMI measurement, awareness on Health Education were conducted 35 students at elementary school have been given an awareness drive regarding importance of healthy food and hazards of junk food with the help of Chitkara School of Nursing. Various activities like weight, height, BMI measurement, awareness on Health Education were conducted.

Awareness Regarding COVID19 and distribution of sterilizers on 2021, March 20th in Village Mohi Khurd. An awareness due of COVID-19 and distributed sterilizers to the beneficiaries
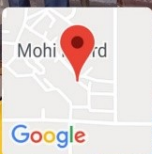
Installation of Sanitizer Machine on 2021, March 26th in Village Shamdoo The sanitizing machine was handed over to the village sarpanch, Mr. Subash Sharma. Thereafter, this machine was installed outside the gurudwara sahib of village Bathonian. One automatic sanitizer machine is donated and then installed by Chitkara University, STI-HUB team in village Shamdoo.

Radio Talk regarding useful tips to maintain good health on 2021, May 01st A Radio program was broadcasted to nearby villages on Radio Chitkara (107.8 FM). Prof (Dr) Jyotsna Kaushal shared useful tips to maintain a good health. Due to increasing rate of COVID19 patients in the villages a radio program was conducted through the Community Radio.

Radio talk on breathing Exercise on 2021, May 04th This is started from May1 and every day, Chitkara Radio is broadcasting under Yog Charcha. To build immunity and enhance the lung capacity.

Radio Talk on Awareness of COVID-19 and Black-Fungus on 2021, June 01st A Radio Talk was conducted to spread awareness on Covid and Black Fungus to nearby villages of Chitkara University under Science and Technology Innovation Hub. All questions were answered by our expert Dr. S.P. Surila. The other panelists were Dr. Rajesh Kaushal, Dr. Naveen Kumar, and Dr. Bhanu Sharma.

Vaccination Drive on 2021, May 12th in Village Kalo Majra Chitkara University STI-HUB is also motivating and arranging the vaccination at Kalomajra Health Center. The drive was started from May 12 where beneficiaries are regularly vaccinated against the Coronavirus.

2nd Year Activities

Science and Technology for Health and IOT Education Combined training session was arranged for the beneficiaries of village Surajgarh on **04 April 2022** in Chitkara University, Rajpura, Punjab. On this event, experts from various verticals of STI-hub delivered the knowledgeable session to the villagers. From this session, recipients gained valuable information about the weather forecasting, animal husbandry and use of temperature monitoring device. Apart from this, the participants were trained on different technological healthcare devices. Moreover, health care tips were given by Health Science Department of Chitkara University. Beneficiaries showed their interest, and their feedback was taken for the purpose of further enhancement, thus making it more useful and interactive.

Water Testing and Awareness at STI HUB, Chitkara University on **5th April 2022**. The awareness talk was organized with the 45 beneficiaries of Pehar Kalan who were invited with the consent of the sarpanch to STI HUB, Chitkara University. The participants were from all categories- children, young girls, boys, and old persons. The event started with a presentation on awareness of water scarcity in Punjab in the coming years and different methods for water testing. It was conducted by Dr Jyotsna Kaushal. The demonstration of water testing was shown by Shubam Sudan and Ajay Khujaria. Dr Naveen Sharma emphasized the importance of e-health services provided by Chitkara University under the project.

On the **19th of April 2022**, **Multigenerational Health Awareness Event at STI HUB** Dr. Bhanu leads a comprehensive health awareness session at STI HUB, Chitkara University. The participants are from diverse age groups, including children, young girls, boys, and elderly individuals from village of Rajpura, aligning with STI HUB's commitment to community engagement. E-Health services and a discussion on the transformative impact of digital healthcare solutions is shared with the participants.

IoT Training Session by Dr. Naveen Kumar at STI HUB, Chitkara University on 3 May 2022. Dr. Naveen Kumar engages for awareness talk with the beneficiaries of village who were invited with the consent of the sarpanch to STI HUB, Chitkara University for an interactive Internet of Things (IoT) training session at STI HUB, Chitkara University, imparting knowledge on cutting-edge technologies. The session, part of the STI HUB project, emphasizes the role of IoT in shaping the future.

IOT hands on training and water testing awareness at STI HUB, Chitkara University on 17 May 2022 The awareness talk was organized with the beneficiaries of village of Rajpura. The participants were from all categories- children, young girls, boys, and old persons. The event started with a presentation on awareness of technological uses in our day-to-day life. It was conducted by Dr Jyotsna Kaushal. The demonstration of water testing was shown by Shubam Sudan and Ajay Khujaria. Mr. Mohit Kumar emphasized the importance of IOT devices

	and technological services provided by Chitkara University under the project.
	On the **7th of July 2022**, **an E-health awareness event was conducted at the STI HUB of Chitkara University**. The awareness session was arranged for a group of beneficiaries. The attendees were invited to the STI HUB at Chitkara University with the approval of the sarpanch. The study included participants across several age groups, encompassing children, adolescent females, boys, and older individuals. The program commenced with a presentation that focused on raising awareness of IOT devices and the significance of the e-health services offered by Chitkara University as part of the project. The study was conducted by Dr. Rajesh Kaushal.
	Training and testing of cattle body temperature monitoring system in Village Mohikhurd on **19th July 2022.** An awareness session was conducted in village Mohikhurd to make the beneficiaries aware about maintaining cattle health and also delivered a detailed session by Mr. Mohit Kumar regarding the use of cattle temperature monitoring device. By using the device, they can check the temperature of cattle at regular intervals and can provide the treatment to cattle if they are infected.

Water Testing in Village Nepra on 19th July 2022. An awareness visit on water testing was conducted in Village **Nepra**. People of middle age & old age groups (ladies) from the village were gathered near Gurudwara, Village Nepra. Mr. Shubam Sudan explained the testing parameters and Mr. Ajay Khajuria demonstrated the water testing. Few home remedies for cleaning water were discussed by Mr. Shubam Sudan and Ajay Khajuria and were also informed to get their water testing done in our lab, Centre for water sciences, Chitkara University, Punjab.

Remotely Medical consultation via E-dispensary in Village Nepra. A healthcare activity was conducted by the STI-hub team on **July 19th, 2022**, with the expert doctor, Surinder Paul, from Neelam Hospital, Rajpura, and students of the Health Science department. Students assisted the doctor during the medical consultation of the Nepra village residents. The beneficiaries were connected remotely with the doctor through the E-dispensary software, and the doctor gave the consultation to the beneficiaries.

Testing and Training on weather forecasting IMD Portal.

A training session was conducted on **20th July 2022** to provide information about IMD portal to the beneficiaries of village **Saidkheri.** The STI-Hub staff members visited the village and delivered a knowledgeable session to the beneficiaries and also guided them to shuffle the crops according to the climate change and keep visiting IMD portal to get the latest alerts.

Learn Solar System using Virtual Reality in Village Surajgarh on 21st July 2022. AR/VR vertical conducted one day activity at Govt Primary School, Surajgarh. Dr. Bhanu Sharma from CURIN, Chitkara University interacted with students. She interacted with students and 4-5 youngsters about the technology importance in society and daily life. Students experienced the virtual tour of Galaxy and explored the Augmented Reality based visit of world using ARGlobe. Students were very excited to learn new technologies. Ms. Pooja conducted the fun activity using AR colouring sheets.

Combined workshop for AR VR, water testing and E- health services conducted on 21st July 2022. A session for awareness towards water scarcity in Punjab and how to clean water at home is discussed and demonstrated some IOT based tools for water purification by Dr. Jyotsana and Dr. Rajesh Kaushal. Dr. Bhanu showcases the wonders of Augmented Reality (AR) and Virtual Reality (VR) technologies at STI HUB, Chitkara University. The engaging demonstration conducted under the project, exploring innovative applications of AR VR in education and beyond. People from different age groups participated in this workshop session.

Remotely Medical consultation via E-dispensary Dr. Surinder Paul of Neelam Hospital and the nursing students of the Health Science department remotely checked the beneficiaries of village Gardi Nagar using E-dispensary software on **July 25, 2022**. After analyzing the patient's health and connecting with the beneficiaries via the video conferencing function of the E-dispensary program, the doctor prescribed medicine and also suggested the STI-Hub team for E-dispensary software improvement.

Sci-Math using AR/VR in Village Jhansla on **26th July 2022**. AR/VR vertical conducted one day activity at Govt Senior Secondary School, Jhansla. Dr. Satyam and Dr. Bhanu Sharma from CURIN, Chitkara University interacted with students. Dr Satyam delivered one hour lecture and taught the tricks of mathematics to students. Students experienced the virtual tour of Galaxy and explored the Augmented Reality based visit of world using ARGlobe. Students were very excited to learn about new technologies. Dr. Satyam taught the students about the importance of Science and Technology in society and how the emerging technologies solved the societal problems in present and will solve in future.

Training and Testing of Cattle Body Temperature Monitoring System in Village Jansua on **28th July 2022**. Another cattle health monitoring session was conducted at village Jansua to train the farmers to maintain their cattle health. The STI-HUB team introduced the cattle temperature monitoring device and requested the farmers to give their consent to apply this device on the cattle ears. Majority of the cattle owners showed their willingness for the monitoring session.

Science and Technology for Clean Water, Health, Education, and Agriculture in Jalalpur on 30th July 2022. In order to encourage the application of science and technology for cleaning water, education learning techniques, E-dispensary software, agriculture techniques, and for animals a one-day event was held in the village Jalalpur district Patiala on 30th July, 2022. This session was delivered by the expert team members of STI-Hub. On this occasion, the beneficiaries got information about the cleaning method of water and how to check the animal's health condition with the use of IoT-based temperature devices. Along with this, we delivered a session on educational techniques using AR/VR learning. Dr. Raj Kumar prescribed the medicine to the patients via E- dispensary software. This activity was conducted under the STI-HUB (Science Technology and Innovation Hub) project funded by the department of science and technology.

Remotely Medical consultation via E-dispensary. Using a real-time patient monitoring system, another E-dispensary session was held on **2nd Aug, 2022**. An expert team of Neelam hospital (Rajpura) physicians assisted in conducting the session in the village Ajrawar, Rajpura. The doctor used the E-dispensary software to diagnose patients remotely and prescribed the medicine slip with help of Health Science students of Chitkara university.

The combined session, held on **August 2, 2022**, featured **an informative discourse on raising awareness about water and practical insights into weather forecasting using IMD portal**. Dr. Jyotsana guided participants through the discussion, including the demonstration of home based techniques for water purification. Simultaneously, Dr. Naveen Kumar presented an awe-inspiring showcase of IOT devices & technologies at STI HUB, Chitkara University.

Remotely Medical consultation via E-dispensary in Village Pilkhani on 3rd August 2022. The STI-Hub team of Chitkara University organized another session for monitoring and diagnosing the patient via E- dispensary in village Pilkhani, Rajpura with the contribution of Neelam Hospital's Doctors and Health Science student of Chitkara university. In this session medical problems of the patients were monitored with the help of software E-dispensary. During this activity doctor suggests adding a separate column for the advised report.

E-Health Services Emphasized by Dr. Naveen Sharma at STI HUB on 4 August 2022. Dr. Naveen Sharma underscores the significance of e-health services provided by Chitkara University under the STI HUB project for the beneficiaries of the village of Rajpura. The commencement of the event featured a presentation enlightening the audience on the awareness of technological applications in our daily lives and different E- services.

Science and Technology for IOT, health services and Agriculture held on **5 Aug 2022**. The primary objective of this session was to enlighten the beneficiaries about innovative Agricultural techniques, remote patient diagnosis, and consultation facilitated through E-dispensary software. Additionally, the session aimed to impart knowledge about assessing the IoT techniques in agriculture and animal husbandry practices. The active participation and keen interest displayed by all the beneficiaries underscored their appreciation for the valuable efforts made by STI-Hub at Chitkara University.

Remotely Medical consultation via E-dispensary in Village Jhansla on **8th August 2022**. STI-HUB team conducted a training session on E-Dispensary software with the help of the health science department, at Chitkara University, Punjab in the village Jhansla. The doctor of Neelam Hospital has diagnosed the patient using E-Dispensary software during the session. The main purpose of this session was to build up a beneficial platform that gives benefits to the villagers.

Cattle body temperature monitoring system and real-time data capturing in Village Thua on **8th August 2022**. Another cattle health monitoring session was conducted at village Thua to train the farmers to maintain their cattle health. The STI-HUB team introduced the cattle temperature monitoring device and requested the farmers to give their consent to apply this device on the cattle ears. The majority of the cattle owners showed their willingness for the adoption of this device.

Remotely Medical consultation via E-dispensary in Village Suhron on **10th August 2022.** To track and diagnose patients in real-time a session was organized under the affordable healthcare vertical. This session took place in the village of Suhron with the assistance of Dr. Raj Kumar from the Neelam Hospital, Rajpura, and students of the Health Science Department, Chitkara University. This session was held to follow up with the patients on their medical problems. During this activity, beneficiaries suggest adding a Logout option for exit from their profile account.

Remotely Medical consultation via E-dispensary. Under the STI-Hub project, the activity on affordable healthcare was conducted in the village of Khandoli on **16th August 2022.** For this activity, Dr. Raj Kumar from Neelam Hospital was appointed for the medical consultation. The doctor communicated with the beneficiaries via E-dispensary software and the doctor prescribed the medicine after the diagnosis of patient. At the second end, the Students from the Health Science Department (Chitkara University) checked the patients and remotely informed the doctor.

Science and Technology for Clean Water, Health, and AR VR in education session. Another combined event of four verticals was conducted on **22 August 2022**, at Chitkara University, Rajpura, Punjab. The beneficiaries of village Jansua participated in this session. An informative discourse on raising awareness about water scarcity. Dr. Jyotsana and Dr. Rajesh Kaushal guided participants through the discussion, including the demonstration of IoT-based tools for water purification. Simultaneously, Dr. Bhanu showcased Augmented Reality (AR) and Virtual Reality (VR) technologies at STI HUB, Chitkara University. The demonstration, conducted as part of the overarching project, delved into the innovative applications of AR and VR in education and various domains. Notably, individuals spanning different age groups actively participated in this engaging workshop session, fostering a diverse and inclusive learning environment.

Testing and Training on Weather Forecasting Tools and Innovations in Village Bathonia on 22nd August 2022. This session primarily focused on the IMD Mausam, A few STI-Hub project staff members of Chitkara University, Punjab visited village Bathonia and provided information about the "IMD portal" to the beneficiaries. Furthermore, they told the beneficiaries to check the weather conditions through the IMD Android application.

Monitoring and Diagnosing Patients Using E- Dispensary Another session was held on 23rd August 2022 in village Mohikhurd under the Affordable Healthcare vertical to monitor and diagnose patients in real-time with the contribution of Neelam Hospital's Doctors and Health Science students of Chitkara University. During this monitoring and diagnosing session patients discussed their medical issues with the doctor via E-dispensary software and availed the medical benefits.

Cattle body temperature monitoring system and real time data capturing A training session was conducted for farmers to maintain the health of their cattle with the help of a temperature monitoring device in village Suhron on **26th August, 2022.** This session was delivered by the expert Veterinary doctor. In this program, doctors shared the technique of use temperature device and how it put on their cattle. Along with this, doctor also aware the beneficiaries regarding the home remedies to treat their cattle.

Testing and Training on Weather Forecasting Tools and Innovations. In order to train the beneficiaries of village Madanpur Chalehri regarding use of IMD Portal and E-Mausam application, a training session was held on **August 30, 2022**. The STI-HUB staff members went to the village and trained the beneficiaries, as well as gave them advice on how to optimize their crop rotation with climate change and how to regularly check the IMD portal for the most recent notifications.

Combined Session/Workshop of STI-Hub Chitkara University. On the **5th of September 2022**, a combined session/workshop was conducted at Chitkara University's STI Hub in Punjab. Over 55 School students actively participated in this workshop. These sessions enlightened the students about e-dispensary services, IoT-based devices for village animals, and water cleanliness conducted by STI-Hub team members. Dr. Naveen Sharma, Dr. Rajesh Kaushal, and Dr. Jyotsna Kaushal delivered expert lectures on weather forecasting, animal husbandry, and the use of temperature monitoring devices.

Awareness Program for school students at Chitkara University. A collaborative awareness program took place at Chitkara University's STI Hub in Punjab on **September 7, 2022**. This program attracted the active participation of more than 50 school students. During this program, the students were educated on various topics, including e-dispensary services, IoT-based devices for village animals, and the importance of water cleanliness, all facilitated by STI-Hub team members.

Combined Awareness Session at STI HUB, Chitkara University, September 8, 2022. An awareness session was held at STI HUB, Chitkara University, on September 8, 2022, with 50 village beneficiaries, as authorized by the sarpanch, were welcomed to STI HUB, representing diverse age groups, including children, young girls, boys, and elderly individuals. The session commenced with a presentation that shed light on the impending water scarcity issues in Punjab in the years to come, as well as various techniques for water testing. Dr. Jyotsna Kaushal led this presentation and also Dr. Naveen Sharma highlighted the significance of e-health services provided by Chitkara University as part of the project.

Water Testing in Village Alampur on 9th September 2022. An awareness visit on water testing was conducted in Village Alampur. People of middle age & children from the village were gathered in the Gurudwara of the village. Initially, they were informed about the quality parameters for water testing, and then some water tests were done from their houses, ponds,etc. with some parameters. Mr. Shubam Sudan explained the testing parameters and Mr. Ajay Khajuria demonstrated the water testing. Few home remedies for cleaning water were discussed by Mr. Shubam Sudan and Ajay Khajuria and were also informed to get their water testing done in our lab, Centre for water sciences, Chitkara University, Punjab.

Cattle body temperature monitoring system and real time data capturing. A session was conducted on animal husbandry in village Pehar Khurd on 12th Sept. 2022. For this activity a veterinary doctor was invited, and he delivered an expert talk on cattle temperature monitoring device to the farmers and doctor checked the various cattle to demonstrate the working of the device and they further prescribed medicines to the farmers for their cattle's based on the disease diagnosed.

On the **14th of September 2022**, the STI-Hub team from Chitkara University conducted **a remote medical consultation session using an E-dispensary** in the village of Rajpura. This initiative involved collaboration with doctors from Neelam Hospital and health science students from Chitkara University. During this session, the team utilized E-dispensary software to monitor and diagnose the health issues of patients. As part of this activity, a doctor recommended the addition of a dedicated section for advised medical reports.

Water Quality and IoT in agriculture Awareness Program at STI HUB, Chitkara University, September 19, 2022. On September 19, 2022, an awareness program took place at STI HUB, Chitkara University, attended by villagers and students from Punjab. The session kicked off with a presentation aimed at raising awareness about the imminent water scarcity issues expected in Punjab in the coming years. Additionally, various methods for water testing were introduced during the presentation, which was expertly conducted by Dr. Jyotsna Kaushal. The importance of

	IoT in agriculture was also explained by Dr. Rajesh Kaushal and Dr. Naveen Kumar.
	On September 21, 2022, at STI HUB, Chitkara University, a health awareness program took place with villagers from Punjab. Dr. Rajesh Kaushal led this enlightening presentation and taught the participants about health.
	Deployment of weather forecasting system and its testing A training session was conducted on **September 22, 2022**, to instruct the beneficiaries of village Faridpur on how to access the IMD Portal and the E-Mausam application. The STI-hub staff members visited the village and installed the application in the mobile phones of villagers and guided them on how to check the latest weather condition through this service in order to protect their crop.
	Science and Technology for Clean Water, Health, Education and Agriculture. A combined training session was conducted on all verticals of the Science Technology and Innovation hub for the beneficiaries of village Jalalpur on 23rd September 2022. This event was basically to demonstrate the different devices and software developed by STI-hub team. The participants learned the usage of an IoT-based temperature monitoring device that can be utilized to monitor animal's health conditions. The session also helped villagers to know how to check the quality of water and a lecture on health fitness methods was delivered by the Health Science department of Chitkara University, Rajpura. All the villagers had

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<td>given positive feedback regarding the training activity.</td>
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<td>Testing and Training on Weather Forecasting Device A training session was conducted in the village of Mohikhurd on 28th September 2022 to make the villagers aware about the changing weather conditions by the use of E-Mausam application. The team of STI-hub visited the village and helped them to install the application through which the beneficiaries can check the latest information about weather conditions to save their crops.</td>
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<td>Testing of water forecasting tools On the 29th of September 2022, a testing and training event took place in Village of Rajpura block emphasizing the use of weather forecasting tools and innovations. During this session, a group of Chitkara University's STI-Hub project staff members visited the village and introduced the residents to the "IMD portal." They also instructed the attendees to utilize the IMD Android application for monitoring weather conditions.</td>
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<td>Water Testing Awareness program at STI HUB, Chitkara University, October 06, 2022. An awareness program was held at STI HUB, Chitkara University on October 06, 2022, with 50 school students from Punjab. The session commenced with a presentation focusing on raising awareness about the impending water scarcity in Punjab in the coming years, as well as presenting various methods for water testing. Dr. Jyotsna Kaushal conducted this informative presentation. Following the presentation, practical demonstrations of</td>
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	water testing techniques were provided by Shubam Sudan and Ajay Khujaria.
	A comprehensive session encompassing Science and Technology applications for Clean Water, Health, Education, and Agriculture was conducted on **October 7th, 2022, by STI -Hub at Chitkara University**. The primary objective of this event was to showcase the diverse devices and software solutions developed by the STI-hub team. The participants were instructed on how to use an Internet of Things (IoT)-based temperature monitoring device, which can be employed to track the health status of animals. Additionally, the session included guidance on assessing water quality, and the Health Science department of Chitkara University, Rajpura, delivered a lecture on health and fitness methods.
	On **October 8, 2022**, a groundbreaking skill development program unfolded at STI HUB, Chitkara University, harnessing the power of augmented reality/virtual reality (AR/VR) technology. Attended by 50 enthusiastic students hailing from schools and villages in Punjab, this initiative aimed to empower participants with essential knowledge and practical skills in AR/VR. he diverse group of students, comprising both urban and rural backgrounds, showcased the inclusive nature of this skill development initiative.

STI activity for Heath Education, Water quality, and IoT in Agriculture. On **October 10, 2022**, Chitkara University Rajpura, Punjab, hosted a collaborative event involving four different areas of expertise. The attendees from Village of Rajpura actively participated in this interactive session. Experts from each vertical within the STI-Hub took turns delivering presentations to the attendees. The primary aim of this session was to educate the beneficiaries on new educational techniques, remote patient diagnosis and consultation through E-dispensary software, methods for assessing drinking water quality, and the implementation of IoT techniques in agriculture and animal husbandry. All the beneficiaries expressed their keen interest in and appreciation for the efforts made by STI-Hub at Chitkara University.

Integrated STI Program on Health Education, Water Quality, and IoT in Agriculture at Chikara University, Punjab. On **October 17, 2022**, Chitkara University in Rajpura, Punjab, played host to a collaborative event that spanned four distinct areas of expertise. Actively engaged participants from the Rajpura block village joined in this interactive session. Experts from each specialized branch within the STI-Hub took turns delivering insightful presentations to the audience. The central objective of this session revolved around enlightening the beneficiaries about novel approaches to education, the utilization of E-dispensary software for remote patient diagnosis and consultations, techniques for assessing the

	quality of drinking water, and the incorporation of IoT methods in agriculture and animal husbandry.
	On **October 18, 2022**, a skill development program utilizing augmented **reality/virtual reality (AR/VR) technology** was conducted at STI HUB, Chitkara University, with the participation of 50 students from schools and villagers from Punjab. The central aim of this initiative was to equip students with a fundamental grasp of AR/VR technology, enabling them to enhance their practical skills. Dr. Bhanu Sharma, representing STI-Hub, imparted the essential concepts to the students.
	STI program Covering Health Education, Water quality and IoT in Agriculture at Chikara University, Punjab. On **October 19, 2022**, Chitkara University in Rajpura, Punjab, served as the venue for a collaborative event that encompassed four STI verticals. Enthusiastically engaged participants from the Rajpura block village actively participated in this interactive session. Proficient experts from each specialized domain within the STI-Hub took turns delivering enlightening presentations to the audience. The central objective of this gathering was to inform the beneficiaries about innovative educational approaches, the practical application of E-dispensary software for remote patient diagnosis and consultations, methods for evaluating the quality of drinking water, and the integration of IoT techniques in agriculture and animal husbandry.

On 20 October, 2022 AVR vertical conducted activities for MohiKhurd and Thua village beneficiaries. Two activities were conducted. This activity was conducted to make the students well-versed with trending technologies like augmented reality and virtual reality. They got to know various aspects of life which could be covered with these technologies. These are widely used in defense, tourism, the medical domain, education and at many more places. Students were very excited after experiencing the virtual scenario by being in the real world. Ms. Sheena also imparted some knowledge to the girl students regarding personal hygiene and its importance. They were told that maintaining a clean, healthy external body requires good personal hygiene.

An interactive session was conducted with school students at STI Hub, Chitkara University, Punjab **on 3rd Nov, 2022.** STI Hub staff members delivered lectures to students and share practical experience using different tools.

Water Testing and Awareness at STI HUB, Chitkara University on 5th Nov 2022 The awareness talk was organized with the 45 participants who were invited with the consent of the sarpanch to STI HUB, Chitkara University. The participants were from all categories-children, young girls and boys. The event started with a presentation on awareness of water scarcity in Punjab in the coming years and different methods for water testing. It was conducted by Dr Jyotsna Kaushal. The demonstration of water testing was shown by Shubam Sudan and Ajay Khujaria. Dr Naveen Sharma emphasized the importance of e-health services provided by Chitkara University under the project.

Testing and Training on AR VR Device A training session was conducted in the Chitkara University, Punjab on **7th Nov 2022** to make the villagers aware about the changing weather conditions by the use of AR VR application. Team of STI-hub helped them to install the application through which the beneficiaries can check the latest information about globe & conditions to save their crops.

Science and Technology for Health-Camp A training session was conducted on Affordable Health-care vertical of Science Technology and Innovation hub for the beneficiaries on **7th Nov 2022**. The participants learned to maintain their health and prevention form the viral diseases. The session also helped them to know about health fitness methods was delivered by the Health Science department of Chitkara University, Rajpura. All the villagers had given positive feedback regarding the training activity.

Science and Technology for Clean Water, Health, Education and Agriculture Another combined event of four verticals was conducted on **21th Nov 2022**, at Chitkara University, Rajpura, Punjab. The beneficiaries attended an interactive session. The purpose of this session was to make aware the beneficiaries about new techniques of education, remote patient diagnosing and consulting via E-dispensary software, methods to check the quality of drinking water and implementation of IoT techniques in agriculture and animal husbandry. All the beneficiaries had shown their interest and appreciated the efforts of STI-Hub, Chitkara University.

Science and Technology for Health-Camp A training session was conducted on Affordable Health-care vertical of Science Technology and Innovation hub for the beneficiaries on **22th Nov 2022**. The participants learned to maintain their health and prevention form the viral diseases. The session also helped them to know about health fitness methods was delivered by the Health Science department of Chitkara University, Rajpura. All the villagers had given positive feedback regarding the

training activity.

Science and Technology for IOT and Agriculture, Health and Clean water Another combined event of four verticals was conducted on **23rd Nov 2022**, at Chitkara University, Rajpura, Punjab. The beneficiaries attended an interactive session. The purpose of this session was to aware the beneficiaries about new techniques of education, remote patient diagnosing and consulting via E-dispensary software, methods to check the quality of drinking water and implementation of IoT techniques in agriculture and animal husbandry. All the beneficiaries had shown their interest and appreciated the efforts of STI-Hub, Chitkara University.

On November 24, 2022, the AR/VR Vertical at Chitkara University STI Hub in Punjab organized a Skill Development Workshop using Augmented Reality and Virtual Reality for students. The workshop attracted more than 65 enthusiastic attendees. Mr. Ravinder, an expert in carpentry from Chitkara University, Punjab, led an engaging session where he imparted fundamental carpentry knowledge and demonstrated the use of various tools to the students. The unique aspect of this workshop was the integration of augmented reality technology through the 'My Carpenter' application, enabling students to have a hands-on experience with carpentry basics. The coordination of this workshop was spearheaded by Dr. Bhanu Sharma and her dedicated team. In addition to the carpentry segment, the workshop included informative sessions by experts in various fields. Dr. Naveen Sharma, Dr. Rajesh Kaushal, and Dr. Jyotsna Kaushal enlightened the students about topics such as e-dispensary, IoT-based devices for village animals, and water cleanliness, respectively.

These discussions helped raise awareness among the students about important issues and innovative solutions in these domains.

On December 5th, 2022, Chitkara University in Rajpura, Punjab, hosted an integrated event titled "Science and Technology for IoT and its Applications in Agriculture, Healthcare, and Water Quality." This event brought together four distinct verticals and engaged beneficiaries in an interactive session. The primary objective of this gathering was to enlighten the beneficiaries about cutting-edge educational methods, the use of E-dispensary software for remote patient diagnosis and consultation, techniques for assessing drinking water quality, and the practical application of IoT in agriculture and animal husbandry. The attendees displayed significant interest and expressed their appreciation for the valuable efforts made by the STI-Hub at Chitkara University.

On December 6th, 2022, an informative event titled "Science and Technology Advancements for Clean Water, Healthcare, Education, and Agriculture" took place at university premises. The event aimed to promote the practical application of science and technology in various areas, including water purification, innovative education techniques, E-dispensary software for healthcare, advanced agricultural practices, and animal well-being. The event featured expert team members from the STI-Hub who shared their knowledge with the local community. During the event, beneficiaries gained insights into water purification methods and learned how to monitor animal health using IoT-based temperature devices. Furthermore, an engaging session on

educational techniques leveraging augmented and virtual reality (AR/VR) was conducted. Dr. Raj Kumar provided medical prescriptions to patients through the E-dispensary software. It's worth noting that this initiative was made possible through the STI-HUB (Science, Technology, and Innovation Hub) project, generously funded by the Department of Science and Technology.

On **December 7th, 2022**, a significant event titled "Water Testing and Awareness" took place at the STI HUB, Chitkara University. This awareness session was attended by 45 participants, all of whom were invited with the sarpanch's approval. The participants encompassed various age groups, including children, young girls, and boys. The event commenced with a presentation led by Dr. Jyotsna Kaushal, addressing the critical issue of water scarcity in Punjab in the coming years and presenting various methods for water testing. Subsequently, Shubam Sudan and Ajay Khujaria conducted a live demonstration of water testing procedures. Naveen Sharma, during the event, underscored the significance of the e-health services offered by Chitkara University under its ongoing project. This event served as a vital platform for raising awareness about water quality and health services, benefiting a diverse audience in the community.

On **December 19th, 2022, a** collaborative event titled "Science and Technology Advancements for Clean Water, Health, Education, and Agriculture" took place at Chitkara University in Rajpura, Punjab. Numerous beneficiaries participated in an interactive session with a specific focus on raising awareness. The primary objective of this gathering was to inform and educate the beneficiaries about innovative approaches in education, remote patient diagnosis and consultation facilitated by E-dispensary software, techniques for assessing drinking water quality, and the practical implementation of IoT methodologies in agriculture and animal husbandry. The event received positive responses, with all the beneficiaries displaying keen interest and expressing their appreciation for the efforts made by STI-Hub at Chitkara University.

On **December 20th, 2022**, a multifaceted event titled "Advancements in Science and Technology for IoT, Agriculture, Healthcare, and Clean Water" was conducted at Chitkara University in Rajpura, Punjab. Diverse beneficiaries participated in an engaging and informative session. The primary purpose of this event was to enlighten the beneficiaries about cutting-edge developments in education, remote patient diagnosis and consultation using E-dispensary software, techniques for assessing drinking water quality, and the practical application of IoT methodologies in agriculture and animal husbandry. The response from the beneficiaries was overwhelmingly positive, as they demonstrated a strong interest in the subject matter and expressed their appreciation for the efforts of STI-Hub at Chitkara University.

"Health-Camp: Training for Affordable Healthcare" On **December 21st, 2022**, a training session was organized by the Affordable Healthcare vertical of the Science, Technology, and Innovation Hub. Beneficiaries participated in this session, where they were instructed on health maintenance and viral disease prevention. The Health Science department at Chitkara University, Rajpura, delivered valuable insights into health and fitness methods. The feedback from all the villagers was overwhelmingly positive, highlighting the effectiveness of this training activity in enhancing their knowledge and well-being.

On December 22nd, 2022, Chitkara University in Punjab organized a training session aimed at raising awareness among villagers about the dynamic nature of weather conditions. This informative session focused on the utilization of the E-Mausam application. The STI-Hub team played a crucial role in assisting the villagers in installing this application. By doing so, the beneficiaries gained the ability to access real-time information about weather conditions, a vital resource to help safeguard their crops. This training event sought to empower villagers with valuable knowledge and tools for better agricultural decision-making.

3ʳᵈ Year Activities

On **January 2ⁿᵈ, 2023,** Jalalpur, a district in Patiala, witnessed a significant event titled "Advancements in Science and Technology for Clean Water, Healthcare, Education, and Agriculture." This event was orchestrated to champion the practical application of science and technology in several critical domains, encompassing water purification, innovative educational methods, E-dispensary software for healthcare, cutting-edge agricultural practices, and the welfare of animals. Distinguished members of the STI-Hub expert team were pivotal in sharing their knowledge and expertise with the local community. Throughout the event, beneficiaries were enlightened about water purification techniques and instructed on how to employ IoT-based temperature devices for monitoring animal health. Additionally, a captivating session focused on educational techniques that leverage augmented and virtual reality (AR/VR). Dr. Raj Kumar was instrumental in providing medical insights and services to the attendees. This event served as a platform to foster innovation and knowledge-sharing, contributing to the betterment of the local community in various crucial aspects.

Virtual Reality Solar System Exploration in Surajgarh Village" On **January 3ʳᵈ 2023**, the AR/VR vertical organized an engaging one-day event at the Government Primary School in Surajgarh, focused on educating students about the solar system through virtual reality. Dr. Bhanu Sharma, a representative from CURIN at Chitkara University, interacted with the students and a group of young individuals. During these interactions, the significance of technology

in our society and daily lives was emphasized.The event allowed students to embark on a virtual tour of the galaxy and experience an augmented reality-based exploration of the world using ARGlobe. This immersive experience captured the students' enthusiasm and ignited their curiosity about new technologies. To further engage the participants, Ms. Pooja organized a fun activity using AR colouring sheets. This event was a unique opportunity for the students to expand their knowledge and engage with innovative educational tools.

On **Janurary 4th 2023**, the AVR Vertical conducted a series of educational activities for the beneficiaries villages. These activities aimed to familiarize students with cutting-edge technologies such as augmented reality and virtual reality, providing them with insights into the various facets of life that can be enhanced using these technologies. Augmented and virtual reality technologies find applications in diverse fields, including defence, tourism, healthcare, education, and numerous other domains. Students were particularly enthusiastic after experiencing these technologies, as they allowed them to immerse themselves in virtual scenarios while remaining in the real world. In addition to the technological exposure, Ms. Sheena also provided valuable guidance to the female students on personal hygiene and its significance. They were educated on the importance of maintaining clean and healthy bodies through good personal hygiene practices. This comprehensive initiative not only introduced students to innovative technologies but also promoted essential knowledge regarding personal well-being.

"On **January 5th, 2023**, STI-Hub Conducts Key Workshop on the Role of Science and Mathematics in Society for Bathonian Beneficiaries "On January 5th 2023, STI-Hub organized a significant workshop addressing the pivotal role of science and mathematics in society, particularly for the beneficiaries of Bathonian. Dr. Satyam served as the resource person, providing valuable insights and knowledge. During the workshop, Dr. Bhanu Sharma, Dr. Naveen Sharma, and Dr. Rajesh Kaushal actively engaged with students, delivering information on AVR, healthcare, and IoT, respectively. The primary objective of this activity was to impart essential knowledge about the fundamental concepts of science and mathematics. Students were enlightened about the fact that a solid foundation in mathematics and science is not only crucial but opens doors to financial literacy, nurtures critical thinking, fosters healthy decision-making, and, most importantly, grants them the intrinsic joy of exploring these subjects. This mastery also nurtures self-confidence, empowering students with skills that have enduring significance in their academic and personal lives.

Training and Testing of cattle body temperature monitoring system in village Jhansla on January 09, 2023. To provide the training session to the beneficiaries of village Jhansla, an activity has been conducted by STI-hub project staff on January 09, 2023. Staff members visited the village and provided demonstartion on how to use the cattle body temperature monitoring device and highlighted the benefits of using this device to maintain the health of their animals.

Training and testing of cattle body temperature monitoring system in village Jansua on January 10, 2023. An activity was done on cattle body temperature monitoring system in village Jansua on January 10, 2023 for providing training to beneficiaries regarding the use of temperature monitoring device. The device collects the health data of animal body and sends it to the user's mobile as text message. It is very beneficial to predict animal's health and take preventive measures in advance to avoid complications.

GMCC+J2Q, opposite CHC, KALOMAJRA, Jansla, Punjab 140601, India
Latitude 30.522186666666666°
Longitude 76.67425°
Local 11:41:12 AM
Altitude 198 meters
GMT 06:11:12 AM
Wednesday, 01.11.2023

The activity on Affordable Healthcare under STI-hub project was done on 11th Jan, 2023 in village Ramnagar, Rajpura, Punjab. To measure the basic health parameters, staff from Nursing Department, Chitkara University was assisted with the project staff member of STI-hub to monitor the health parameters of the villagers residing in Ram Nagar. On the other end, Dr. Raj Kumar from Neelam Hospital, Rajpura prescribed the medicines to the patients remotely after diagnosing health parameters through the software.

GJXP+MH9, Urdan, Punjab 140602, India
Latitude 30.549158333333335°
Longitude 76.63637333333332°
Local 11:34:55 AM
Altitude 229.6 meters
GMT 06:04:55 AM
Thursday, 01.12.2023

On 12th Jan, 2023, an activity was conducted in village Urdan, Rajpura. In this activity, the beneficiaries of this village were connected remotely via E-dispensary software with Dr. Surinder Paul of Neelam Hospital, Rajpura to diagnose the health conditions. The nursing staff was present on the patient's end to check the real-time parameters and send it to doctor.

An activity of Affordable Healthcare was held on 16th January, 2023 in village Jhansla, Rajpura under the STI-hub project with the help of nursing department of Chitkara University and project staff team. To check the patient's health status, Dr. Raj Kumar from Neelam hospital, Rajpura diagnosed the patient and prescribed medicines.

On 17th Jan, 2023, a Water awareness activity was conducted in Ram Nagar Village, Rajpura. An awareness visit on water testing was conducted in Village Ram Nagar. Mr. Ajay Khajuria and Shubam Sudan explained the testing parameters and demonstrated the water testing. Few home remedies for cleaning water were discussed by Mr. Ajay Khajuria, Shubam Sudan, and villagers were also informed to get their water samples tested in our lab.

An activity for the beneficiaries of village Rangian was held on 18th January, 2023 for remote health checkup. For this, staff of STI-hub project and nursing staff from Chitkara University visited the village. Moreover, Dr. Surinder Paul from Neelam Hospital diagnosed the patient and prescribed medicines to the patients through E-dispensary software.

An activity has been done in village Mohikhurd, Rajpura on January 19, 2023 on cattle body temperature monitoring system. During this event, detailed working of the temperature monitoring device developed by the STI-hub team was provided to beneficiaries. The beneficiaries showed their interest to learn this advanced cattle temperature monitoring device. The device helps to collect the cattle's body temperature and send it to the user's mobile.

A training session was conducted on January 20, 2023, to instruct the beneficiaries of village Thua, Rajpura on how to access the IMD Portal and the E-Mausam application. The STI-hub staff members went to the village and suggested them to plan crop rotation with respect to climatic changes and how to regularly check the IMD portal for the most recent notifications on weather conditions.

An Affordable Healthcare session was conducted in village Pehar Kalan, Rajpura on Jan 23, 2023. The staff from the nursing department assisted on one end to measure the basic vital parameters of the beneficiaries and on the second end Dr. Surinder Paul checked these parameters and prescribed medicines after diagnosing the patients remotely.

Skill development-based activity using AR/VR under AR/VR vertical was conducted in village Bathonia, Rajpura on Jan 23, 2023. The activity was aimed to educate the students regarding the basic concepts of Electricity and Plumbing occupation. With the help of AR/VR technology, you can enhance your skills. Skill development also plays a pivotal role along with our regular curriculum as it is beneficial in enhancing and embarking practical knowledge among the students. Dr. Bhanu Sharma from STI-Hub explained the basics to students.

Converging Science and Technology: IoT, Agriculture, Health, and Clean Water"On **January 23rd, 2022**, a collaborative event brought together four distinct verticals at Chitkara University, Rajpura, Punjab. The event attracted numerous beneficiaries who participated in an interactive session. The primary purpose of this gathering was to enlighten and inform the beneficiaries about emerging educational techniques, remote patient diagnosis and consultation facilitated by E-dispensary software, methods for assessing drinking water quality, and the practical implementation of IoT methodologies in agriculture and animal husbandry. The response from the beneficiaries was overwhelmingly positive, as they expressed keen interest and appreciation for the valuable efforts put forth by STI-Hub at Chitkara University. This event served as a platform for knowledge-sharing and awareness, with a focus on advancing technology in critical areas.

On the 23rd of January, 2023, a significant healthcare initiative took place in Urdan Village, Rajpura. This activity involved connecting the village beneficiaries with Dr. Surinder Paul from Neelam Hospital, Rajpura, through E-dispensary software for remote health diagnoses. Nursing staff were present on the patient's end to monitor and transmit real-time health parameters to the doctor. This remote healthcare effort aimed to bridge the gap in medical access and provide essential healthcare services to the village community.

On **January 24th, 2022**, the Science, Technology, and Innovation Hub conducted a comprehensive training session that encompassed all verticals for the beneficiaries of Jalalpur village. This event served as a platform to showcase the diverse devices and software solutions developed by the STI-Hub team. The participants were educated on the utilization of IoT-based temperature monitoring devices, which can play a crucial role in monitoring the health conditions of animals. Additionally, the session equipped villagers with knowledge on how to assess water quality. In an effort to promote health and well-being, the Health Science department of Chitkara University, Rajpura, delivered a lecture on health and fitness methods. The positive feedback from all the villagers underscores the significance of this training initiative in empowering the community with technology and knowledge across various vital verticals.

To train the beneficiaries of village Saidkheri, Rajpura, STI-hub project team visited the village on January 25, 2023. Staff members addressed the villagers on the benefits of using India Meteorology Department portal and described them about how they can check upcoming weather condition on this IMD Mausam portal.

On January 25, 2023, a groundbreaking session unfolded at STI HUB, Chitkara University, under the banner of "Immersive Learning Experience with AR and VR." Dr. Bhanu, a visionary in the field, spearheaded this engaging initiative. Together with a group of school students, he embarked on a journey to transform education through the captivating realms of Augmented Reality (AR) and Virtual Reality (VR) technologies. This visionary approach shattered the boundaries of traditional learning, converting it into an interactive and captivating experience, and in the process, it paved the way for a futuristic educational landscape. The students' palpable excitement and enthusiasm were palpable, underscoring their eagerness to embrace this innovative world of technology-driven education.

To provide the training about the use of cattle body temperature monitoring system, a session was conducted on 27th January, 2023 in village Ram Nagar, Rajpura. The device can measure the vital signs of the cattle which could help in diagnosing the problem early. It sends message on user's mobile via using IoT to inform the body temperature of animals to protect the animals from the major disease.

Real-Time Patient Monitoring and Diagnosis through E-Dispensary in Chitkara university" On **January 27th , 2023,** a vital session took place for the beneficiaries Mohikhurd village, organized under the Affordable Healthcare vertical. This session focused on real-time patient monitoring and diagnosis, with active participation from doctors at Neelam Hospital and health science students from Chitkara University. During this session, patients had the opportunity to discuss their medical concerns with doctors through the E-dispensary software, ultimately availing the necessary medical support and services. This initiative underscores the importance of accessible and timely healthcare services, bridging the gap between patients and medical professionals.

Another session of affordable healthcare under DST STI-hub was conducted in village Jalalpur to provide the health check-up via Jiyyo innovation application to the villagers on 06th Feb, 2023. In this session, Dr. Surinder Paul from the Neelam Hospital connected through this application with the beneficiaries. On the patient end, STI-hub project team checked the basic vital parameters with the assistance of students from Health Science Department, Chitkara University, Rajpura.

Immersive Learning Experience with AR and VR at STI HUB on February 6, 2023. Dr. Bhanu leads an engaging session, transforming education through the immersive experiences of Augmented Reality (AR) and Virtual Reality (VR) technologies at STI HUB, Chitkara University with the students of the school. This visionary approach transforms traditional learning into an interactive and captivating experience, paving the way for a futuristic educational landscape. Students are very excited in learning technology.

A session on "Monitoring and Diagnosing Patients Using E-Dispensary" was conducted on **Feb 7 2023**, in Chitkara University, Punjab as part of the Affordable Healthcare initiative. This event brought together doctors from Neelam Hospital and Health Science students from Chitkara University to offer real-time monitoring and diagnosis for patients. During this session, patients had the opportunity to engage in discussions about their medical concerns with doctors through the E-dispensary software, enabling them to access essential medical services and benefits.

STI-hub team visited the village Mohikhurd, Rajpura on February 07, 2023 to train the beneficiaries about the newly developed device and described the benefits of using Cattle body temperature monitoring system. This device can help the villagers with real time data capturing of their animals, which help them to predict the health condition of their best.

An activity was done on February 08, 2023 under the STI-hub project for the beneficiaries of village Surajgarh, Rajpura. To measure the basic health parameters of the villagers residing in Surajgarh, students from Health Science Department, Chitkara University were assisted with the project staff member of STI-hub.

On **Feb 8th 2023**, an important event under the banner of "Water Testing and Awareness" transpired at the STI HUB within Chitkara University. This informative session was graced by the presence of 45 attendees, all of whom had received the sarpanch's endorsement for participation. The attendees represented a wide range of age groups, including children, young girls, boys and ladies. The event commenced with an enlightening presentation led by Dr. Jyotsna Kaushal, focusing on the pressing issue of water scarcity anticipated in Punjab in the years to come. Dr. Kaushal also elaborated on various water testing methods. Following this, Shubam Sudan and Ajay Khujaria conducted a live demonstration of water

testing techniques. Within the event, Naveen Sharma emphasized the significance of the e-health services offered by Chitkara University as part of an ongoing project.This gathering provided a pivotal platform for disseminating knowledge about water quality and the available health services, offering valuable insights to a diverse audience within the community.

To provide **the training about the Jiyyo innovation to the beneficiaries of village Kalomajra, Rajpura**, a session was conducted on **February 09, 2023** with the assistance of students from Health Science Department, Chitkara University. The STI-hub team with the help of healthcare students checked the crucial basic vital parameters and sent the results to doctor end via using Jiyyo application. Dr. Surinder Paul diagnosed the patients remotely on behalf of these parameters.

On **Feb 9th 2023**, Chitkara University in Rajpura, Punjab, hosted a comprehensive event titled "Advancements in Science and Technology for IoT, Agriculture, Healthcare, and Clean Water." This event attracted a diverse audience, all of whom were actively engaged and informed during the session. The primary goal of this event was to educate the attendees about the latest breakthroughs in several critical areas, including innovative developments in education, the utilization of E-dispensary software for remote patient diagnosis and consultation, methods for evaluating the quality of drinking water, and the practical implementation of IoT techniques in agriculture and animal husbandry. The

response from the participants was exceptionally positive, reflecting their strong interest in the presented topics and their sincere appreciation for the contributions of the STI-Hub at Chitkara University.

Another training session was conducted remotely to perform the health checkup via Jiyyo innovation in village Thua, Rajpura on **February 13, 2023** with the assistance of Health Science students of Chitkara University. On the patient end, students checked the basic vital parameters. On the other end, Dr. Surinder Paul from Neelam Hospital diagnosed the patient and prescribed medicines to the patients remotely by using this application.

The STI-hub team performed an activity in the village Jalalpur on February 14, 2023, to train the beneficiaries about the use of the newly developed cattle body temperature monitoring system. The benefit of using this device is that the users can get real time data related to animal's health condition on the mobile through message. Villagers also presented their problems related to cattle's disease, so that team can do work on these problems and provide them with better solution in future.

The activity on Affordable Healthcare under STI-hub project was done in village Shamdoo, Rajpura on February 15, 2023. During this training program, the STI-hub team assisted by the students from Health Science Department, Chitkara team gave the demo on how to use the Jiyyo innovation application to the villagers to measure basic health parameters. Dr. Surinder Paul suggested suitable medicines to the patients remotely.

STI-Hub staff conducted an IoT activity on 16th February, 2023 in village Surajgarh, Rajpura on IMD Mausam portal and application to aware the beneficiaries regarding weather forecasting and how to get the benefits from this website. This will help them to plant and sow the seeds by looking at the weather condition and save their losses from unwanted change in weather.

On February 20, 2023, an activity was done on IMD Mausam to make aware the beneficiaries of village Pilkhani, Rajpura about the weather forecasting. Moreover, the information about the crops harvesting as per the climatic affect is also available on this portal. This awareness session was very helpful for the villagers to save their unaccountable losses.

Rural Realms Explored using Virtual Reality in Village of Rajpura on 23 Feb, 2023. AR/VR vertical conducted one day activity at Govt Primary School. Dr. Bhanu Sharma and Ms Pooja from CURIN, Chitkara University interacted with students. The session explores how these technologies can revolutionize learning experiences in resource-limited settings. The symposium unlocks a world of possibilities, demonstrating how Augmented Reality (AR) and Virtual Reality (VR) can enrich the educational journey for students in rural areas.

Chitkara University in Rajpura, Punjab, played host to a collaborative event on **February 24, 2023**, focusing on two key areas: water quality and IoT in agriculture. This interactive session brought together experts from four distinct domains. Active participation was observed from the residents of Rajpura village, who were eager to engage and learn. Throughout the event, experts representing different verticals within the STI-Hub took the stage to deliver insightful presentations to the attendees. The beneficiaries, who were deeply engaged in these discussions, expressed their genuine interest and appreciation for the dedicated efforts of the STI-Hub at Chitkara University.

"On **February 27, 2023**, an Initiative within the STI-Hub Project Benefiting the Residents of Surajgarh Village, Rajpura" A significant initiative took place on February 8, 2023, as part of the STI-Hub project, aimed at assisting the beneficiaries of Surajgarh village in Rajpura. This effort focused on the measurement of essential health parameters for the village residents. Students from Chitkara University's Health Science Department collaborated with project staff from the STI-Hub to carry out this project.

On February 27, 2023, the STI-hub team performed an activity in the village of Urdan, Rajpura to teach the beneficiaries on how to check & monitor the body temperature of animals by using cattle body temperature monitoring system. STI team gathered the data related to the cattle's health from the villagers, so that the team can work on the basis of collected data.

On February 28, 2023, Water quiz was organised on National Science Day 2023, with beneficiaries of Bathunia at STI HUB, Chitkara University. It was conducted by Dr Jyotsna Kaushal and demonstrated by Mr Ajay Khajuria. Teach students about the scarcity of resources and the importance of saving water. Also taught some household-based techniques for the cleaning of water.

On February 28, 2023, AVR activity was conducted in Govt. Senior Secondary School Mohi Khurd Village. Dr. Bhanu Sharma interacted with students and taught them electricity fundamentals.

On Feb 28,2023 Major activity under STI-Hub conducted a workshop on "Role Science and Mathematics in Society for Bathonia beneficiaries. Dr. Satyam was the resource person. Dr. Bhanu Sharma, Dr. Naveen Sharma and Dr. Rajesh Kaushal interacted with students regarding AVR, Healthcare and IoT respectively. The activity was aimed to educate the students regarding the basic concepts of science and mathematics. They were told that a strong foundation in math and science is crucial for early students. This crucial academic preparation provides doors to financial literacy, critical thinking, and healthy decision-making in addition to the intrinsic pleasure students can find researching these subjects and the self-confidence generated by mastery.

Under the STI-hub project, a training session was conducted for the beneficiaries of village Shamdoo to provide training about IMD portal and E-Mausam application on March 02, 2023. The villagers showed their interest to learn this portal as by using this they can protect their crops from the unwanted damage that can result from changing weather conditions.

On **March 2nd, 2023**, the AR/VR Vertical at Chitkara University's STI Hub in Punjab orchestrated a dynamic Skill Development Workshop that harnessed the capabilities of Augmented Reality (AR) and Virtual Reality (VR) for students. This workshop garnered the enthusiastic participation of over 65 attendees. In addition to the carpentry segment, the workshop featured informative sessions led by domain experts. Dr. Naveen Sharma, Dr. Rajesh Kaushal, and Dr. Jyotsna Kaushal enlightened the students on diverse topics, including e-dispensary services, IoT-based devices for village animals, and water cleanliness, respectively. These discussions not only broadened the students' horizons but also raised awareness about crucial issues and innovative solutions in these domains.

The session was held on March 03, 2023 in village Nepra, Rajpura, to train the beneficiaries about the developed cattle body temperature monitoring system. STI-hub team visited the village and delivered this consciousness session. Apart from it, staff members guided them about functionality of this device and provided a demo, so that they can use the device to protect their animals from the disease by performing regular checkup of animal's body temperature.

"Visionary Health: Eye Screening Camp at Chitkara University" Chitkara University in Punjab played host to an eye screening camp on **March 3, 2023**, as part of the Affordable Healthcare initiative. This event facilitated a collaborative effort between medical professionals from Neelam Hospital and Health Science students at Chitkara University, all working together to promote eye health and well-being.

Chitkara University's STI HUB played host to a significant event on **March 4th, 2023**, titled "Water Testing and Awareness." A diverse gathering of 45 participants, all invited with the sarpanch's endorsement, represented a broad spectrum of age groups, including children, young girls, and boys. The event commenced with an informative presentation delivered by Dr. Jyotsna Kaushal, who shed light on the pressing concern of water scarcity anticipated in Punjab in the upcoming years. Dr. Kaushal also introduced various methods for water testing. Subsequently, Shubam Sudan and Ajay Khujaria conducted a live demonstration of water testing procedures, making the subject tangible for the audience. Within the event, Naveen Sharma emphasized the significance of the e-health services offered by Chitkara University as part of an ongoing project, highlighting the broader impact of these initiatives. This event served as a vital platform for raising awareness about water quality and the availability of essential health services, ultimately benefiting a diverse audience within the community.

On **March 6th, 2023**, a groundbreaking session took place at STI HUB, Chitkara University, titled "Immersive Learning Experience with AR and VR." Dr. Bhanu spearheaded this engaging initiative, where he showcased how Augmented Reality (AR) and

Virtual Reality (VR) technologies can reshape the educational landscape. The beneficiaries of this transformative approach were school students, eager to embark on this exciting learning journey.Dr. Bhanu's visionary approach transcended the boundaries of traditional education, turning it into an interactive and captivating experience. This endeavor paves the way for a futuristic educational landscape where technology-driven learning plays a central role. The enthusiasm and excitement displayed by the students underscored their readiness to embrace this innovative approach to education.

The activity on Affordable Healthcare under STI-hub project was done on 13 March, 2023 in village Faridpur, Rajpura, Punjab. The project staff visited the village and checked the patient's vital parameters. On the other end, Dr. Surinder Paul from the Neelam Hospital analyzed the collected data received via Jiyyo application and prescribed medicine to patients.

The STI-hub team and the Health Science Department of Chitkara University visited the village Urdan, Rajpura on 14th March 2023. The team delivered a session on the uses of Jiyyo application. During this session, Health Science students checked the basic vital parameters of patients and sent it to the doctor's end via using this software. Dr. Surinder Paul diagnosed the patients and prescribed medicines as per the health problem of beneficiaries.

For the beneficiaries of village of Rajpura, a session was conducted on **16 March 2023**, for patient monitoring and diagnosing using E-**dispensary to provide remote the health** fitness. During this activity the basic parameters were checked by the Health Science students and the data was sent to the doctor end via this software. After analyzing the data, Dr. Surinder Paul diagnosed the patients remotely and prescribed medicines to them.

On **Mar 18, 2023**, an activity on Sci-Math with AR/VR took place in the Village of Rajpura. The **AR/VR vertical** of the organization conducted this activity at Govt Senior Secondary School, Dr. Satyam and Dr. Bhanu Sharma, representing CURIN at Chitkara University, engaged with the students during this event. Dr. Satyam delivered an hour-long lecture in which he imparted mathematical techniques and tricks to the students. Additionally, students had the opportunity to experience a virtual tour of the galaxy and explore a world-based augmented reality visit using ARGlobe. The students

	were enthusiastic about learning these new technologies.
	On March 22, 2023, the STI-hub team conducted an event in the village of Rajpura, with the aim of educating the beneficiaries **on monitoring and checking the body temperature of animals** using a cattle body temperature monitoring system. The STI team collected data regarding the health of the cattle from the villagers, which will serve as a foundation for their future work.
	The STI-hub team visited the village Gardi Nagar, Rajpura on 22nd March 2023 for the scheduled activity on Affordable healthcare. On this occasion, Dr. Surinder Paul from Neelam hospital observed the patients at one end and the students of Health Science department checked the vital sign parameters of the patient on other end and sent these parameters through the developed E-dispensary software to doctor for the medical consultation.

An activity of Affordable Healthcare was held on 24th March, 2023 in village Pilkhani, Rajpura under the STI-hub project with the help of students of Health Science Department, Chitkara University, Rajpura and project staff team. These students checked the basic vital parameters. Dr. Surinder Paul received these parameters via E-dispensary software and prescribed medicines after diagnosing the patients remotely.

INDEX OF FIGURES		
Sl. No	**Description**	**Page No.**
Figure 1.	Home Telemonitoring	4
Figure 2.	Number of doctors registered and active from 1961-2030 in India	5
Figure 3.	Usage of IoT-based weather forecasting in farming	9
Figure 4.	IoT-based cattle body temperature monitoring	10
Figure 5.	Ground Water Contamination	11
Figure 6.	Side effects of fluoride on human beings	14
Figure 7.	Role of AR/VR in Education	16