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Role of Sciences in Sustainable Development in This Pandemic Era-"A review on innovations which helpsin Pandemic/Sustainable Development"

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Abstract
In this Continuous development in energy sector almost fully dependent on science due to per day new innovation in this field so vital role of increased energy efficiency in achieving sustainable development. The outcomes are accounted for an examination concerning the job of expanded energy effectiveness in accomplishing feasible turn of events. In the paper the relations are inspected among energy and manageable turn of events, and between energy effectiveness and natural effect and how due to use of science we managed to survive this pandemic situation quite easily and how technology help us in sustaining this time. The hypothetical and useful constraints on expanded energy proficiency are talked about, especially as they identify with practical turn of events. It is demonstrated that energy resources and their utilization are intimately related to sustainable development. It is additionally exhibited that, for social orders to achieve or attempt to accomplish economical turn of events, much exertion should be given not exclusively to finding maintainable energy assets, yet additionally to expanding the energy efficiencies of cycles using these assets.
Keywords— Sustainable; Renewable; Environment; IoT; Coronavirus; COVID-19; Pandemic

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I. INTRODUCTION

Sustainable development is that the organizing principle for meeting human development goals whereas at the same time sustaining the power of natural systems to supply the natural resources and scheme services on that the economy and society dependent. The specified result's a state of society wherever living conditions and resources square measure accustomed still meet human desires while not undermining the integrity and stability of the natural system.[1]

Sustainable development refereed to the event that not solely ends up in economic process however additionally the need of a good distribution of its fruits, that renews and doesn't destroy the surroundings. this kind of development is of nice importance to the poor, because it guarantees them a job in deciding and within the areas that have an effect on their lives, it's for individuals and nature, the advancement of the position of girls in society, and property in its broadest sense is a problem of a good distribution of development opportunities between this and future generations, and if property development is that the method of increasing the cluster of people's decisions, then property is that the development of an individual and his capabilities, whether or not man or lady [1].

Preserving the ecological and biological system is one of the most important aims of the sustainable development process, because the continuity of the human presence depends on this and this requires large efforts and high expenditures for the integrity of the ecosystem for future generations. As for the technological environment, sustainable development aims to resort to the use of technologies with limited environmental damage, and directing to recycle and utilize waste and materials in industrial energy fields [2].

Science is important to tackle complicated challenges for humanity like global climate change, diversity loss, pollution and poorness reduction, because it lays the inspiration for brand new approaches and solutions [3].
This pandemic brought the light on world crisis regarding poverty, hunger, weak health systems and lack of clean water and sanitation, education and global cooperation [4][5].
The COVID-19 pandemic shows that sustainable development goes beyond national strategies. Each individual requirements to settle on wellbeing choices that address private matters just as the

necessities of the more extensive local area, for example, utilizing facemasks on open vehicle, noticing social removing guidance and self-isolating when essential. Such choices can assist with controlling transmission and lessen disease, passing and financial effects [6]

Science, technology and innovation (STI) policies will play a key role not only in post-COVID-19 recovery plans, but also in the decade of action to deliver on the 2030 Agenda for Sustainable Development[7].

II. MAIN PILLAR OF SUSTAINABLE DEVELOPMENT

The three main pillar of sustainable developments are-

1. Protecting the environment
2. Social inclusion
3. Economic growth

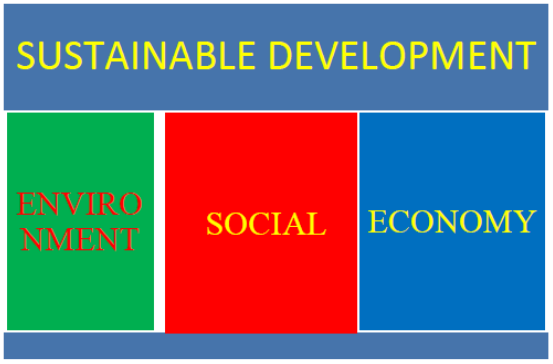

Fig. 1 Pillar of sustainable development

But some scientist and researches opinion is different; according to them the main pillar is environment without a better environment there is no use of society and economy [8][9].

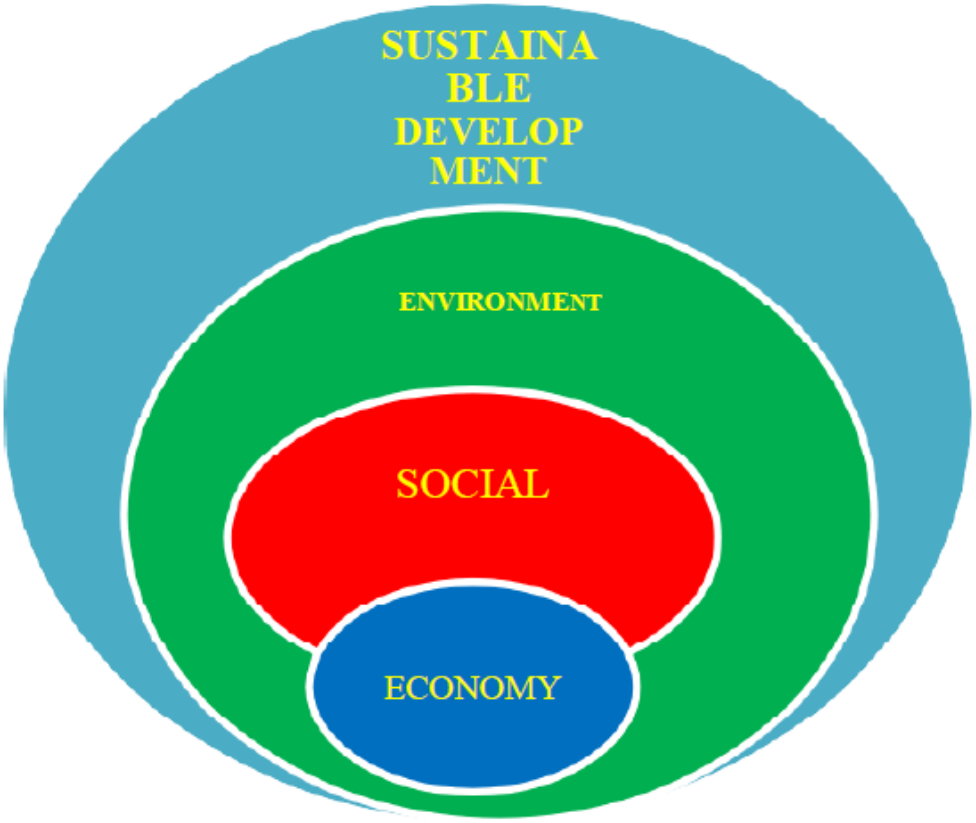

Fig. 2 Another representation of Pillar of sustainable development

III. OBJECTIVES OF SUSTAINABLE DEVELOPMENT

- To protect the Natural Resources
- To make Green/reforestation of the City
- Taking Public Opinion in Development Decisions such as planning decisions, economic, ecology & environmental and feedback of past and proposed developments should be acknowledged.
- To aware people regarding Sustainable Development.
- Make the Best Use of Land according to environment, soil quality, location and

sensitivity
- Balanced Development:
- Efficient and sustainable Urban Design:.
- Usable Community Development
- Conservation of Natural Resources
- Conservation of Energy
- Ecosystem Monitoring:
- Balanced/Innovative Transportation System
- Evaluation/Monitoring/maintenance of Development
- Motivate student and researcher for better research.[10], [11]

UN has declared 17 goals [12] for sustainable development,goals are-

TABLE I
SDS GOALS ACCORDING TO UN AND ROLE OF SCIENCE IN ACHIEVING IT

S. N.	SDs Goals according to UN and role of science inachieving it		
	Goals	**Role of Science/Technology**	**References**
1	No Poverty	By providing a scientific approach which provide people work and generate money	[13]
2	Zero Hunger	Providing quality food toneedy and saving food from spoiling by using preserve technology/using technology in agriculture	[14]
3	Good Health and Well Being	Latest Medical equipment,medicines such as Covid vaccine	[15]
4	Quality Education	Internet/new scientifictechnique	[16]
5	Gender Equality	Monitoring/tracking ofequal pay to all gender	[17]
6	Clean Water &Sanitation	Innovative Water cleaningequipments, treatment plant/cleaning materialsuch as sanitiser	[18]
7	Affordable and Clean Energy	More use of renewable energy,bio gas and proper reuse of energy waste	[19] [20]
8	Decent Work and Economic Growth	In Covid time people can smoothly doing job due to technology	[21]
9	Industry innovationand infrastructure	Innovative approach to conventional industry/sustainable infrastructure by using less harmful materials in eachphase of execution	[22]
10	Reduced inequality	Technology can be accessed by Men and women equally	[23]
11	Sustainable cities and communities	By providing innovativesmart cities /IoT based smart system	[24]
12	Responsible consumption and production	Data monitoring by AI andaccording to data produce/track/consumptiongoods	[25]
13	Climate Action	Decarbonisation, Pollutionmonitoring tools ,Air purifier	[26]
14	Life below water	Cleaning equipment undersea for cleaning of plastic waste	[27]
15	Life on land	Watching animal fromdrone and providing security	[28]
16	Peace, justice and strong institution	Video calling to loved onceprovide harmony and peace/virtual court hearing	[29]
17	Partnership for the goals	Different countries Working jointly for covid vaccine	[30]

IV. ROLE OF SCIENCE AND TECHNOLOGY IN THIS PANDEMIC

A. Use of Artificial Intelligence- AI helps play a role as valuable tool for identification of infections and in monitoring the condition of infected patients, so that amplify and boost the treatment efficiency according to situation. As we can see in April, 2021 the Covid-19(second wave) cases rising but due to lack of forecasting Indian government unable to monitor the situation earlier which leads the Indian health system collapse, this condition can be prevented by proper data forecasting and providing equipment and tools accordingly. For healthcare industries, IoT devices are capable of providing sensor data that can be potentially processed as well as analysed in the real-time. As there is centralized storage of data, thus the collected data can be efficiently processed.

AI can also help in process of treatment regimens, planning of safety and for the formation of various composition, drugs and vaccines [31].

B. IoT in Building Smart Hospitals: To prevent the spread of pandemics with real time ideas and to get real-time suggestions for the purpose of decision-making, the healthcare organizations require apt technologies that can be beneficial for tracking as well as controlling the spread of various diseases. However, many countries face issues in dealing with pandemics.

A system for determining the ECG signals developed in which sitting positions by means of a smart chair senses signals and later signal can be can be examined using a monitoring system [32].

Some areas of IoT in Building Smart Hospitalsare-

In above table an overview of science & technology impact on sustainable developmentgoals mentioned briefly. As we all going through the pandemic so now science and technology is playing a very important role from providing technology and innovative approach for work. (Work over zoom and other application help people do work at home like before Covid-19 era)

Here are some innovations-

1. Secure data of data
2. Tracking of equipment, tools and Instruments
3. 3D Scanning of Bones
4. Augmented Reality
5. Remote health monitoring(Maintaining Distance)
6. Precise treatment
7. Proper management of medicalresources

One system developed by *T. S. Barger, D. E. Brown et al.* to observe, monitor and track the movements and response of patients in in-house facility in order to the check the behavioural patterns and symptoms and further can provide treatment according to that behaviour [33].

M. S. D. Gupta, V. Patchava et al. developed a framework utilizing Raspberry Pi which measures and record ECG esteems notwithstanding other wellbeing parameter of the patient which can be useful for additional assessments of patients [34].

C. Wireless healthcare network to identify covid-19 patient-Various authentic applications will be put in into smart phones, which may build the identification procedure smoother and helpful.

D. Rapid COVID-19 screening- As the case arrived/found initially instance, the
right identification are going to be tried through good connected treatment devices. This ultimately makes the general screening method additional superior.

E. Accurate forecasting of virus -Wireless healthcare network to identify covid-19 patient-Based on the information report offered, the utilization of some method may facilitate to predict things within
the returning times. It'll conjointly facilitate to set up the govt., doctors, academicians, etc.

F-Hardware technology -

Corona Oven

A Bengaluru-headquartered nanotechnology start-up, has come up with first-of-its-kind a product named Corona Oven .Fig.3

It makes use of UV-C light (having a wavelength of 253.7 nm) in combination with significant design parameters.

The device disinfects surfaces (of various objects, personal protective equipment, etc.) from germs including bacteria and viruses.

This unique multi-focal UV disinfection chamber sanitises any surface within 4 minutes. [35]

Fig. 3 Corona Oven

Milagrow Seagull

Milagrow Seagull is a cleaning robot innovated by Indian consumer brand Milagrow. Fig. 4

It displays real-time progress and map while cleaning on the user's device.

The robot plans the path in real-time in each area to reduce the time taken.

This robot vacuum also features anti- bacterial, anti-microbial, and antiviral properties that claims to help minimise the spread of infections in hospitals and similar environments.

The robot can facilitate slight wet cleaning, as per the company's official release.[35]

Fig. 4 Milagrow Seagull[36]

Tata Power Delhi discom launches NB-IoT technology based smart meters

NB-IoT is a new and cost- efficient technology in 4G and 5G spectrum with quick preparation quality.

With this technology, the interference and obstruction arising caused by public network congestion won't hamper the performance of smart meter any longer as data can swimmingly flowthrough a channel.

It'll also enable more number of remote meter readings possible thereby ensuring the safety of the consumers during pandemictimes.

Other Hardware Technology

Spain govt and other countries also using drone camera and other countries with loudspeakers reminding the population to stay at home.

Drones also use for thermal imaging purposes.

Drones can prepare data about crowd gatherings for authorities to monitor and enforce social distancing guidelines.

This data eventually help and also be fed into smart city and Intelligent Transport Systems (ITS) infrastructure.

This aspect can be amplified by the implementation of IoT as objects and infrastructure.

Wearable sensor nodes,ex-smart watch smart helmet

Smartphone based hardware

Camera sensors

Raspberry pi

Automatic door

Oxygen-meter

Pulse meter

Ultrasonic Sensor

Temperature Sensor "LM35" is a low cost and compact IC which is beneficial for measuring temperature range between -55°Cto 150°C and can be interfaced with anymicrocontroller[37]

Software Technology

Smartphone apps such as Co' WIN, Aarogya Setu etc[38].

Virtual communication technology

Software defined network for globalmonitoring

Innovative Work

❖ **Binish Desai's most recent innovation — Brick 2.0 —** comes when the plastic emergency has compounded the world over. The 'Reuse Man of India', who shot to distinction in 2010 for planning P-Block (blocks from mechanical paper and gum squander), spent the most recent couple of months chipping away at changing over disposed of face-covers,PPE suits into blocks and is currently preparing for business creation,.The new blocks will be sold at a similar rate as the P-Block, at □ 2.8 per piece. This kind of work is really a sustainable innovation which gives a innovative materials along with disposing/reusing the waste.

Fig. 5 The Brick-2.0[39]

❖ **IIT-Mandi Developed high-efficiency facemasks-** Considering these conditions, scientists at IIT-Mandi developed a "infection sifting, self-cleaning and antibacterial material" that can be utilized to make face mask and other protective stuff.

Fig. 6 Antimicrobial coating on a standard face mask.[40]

In a press release issued earlier this week, Dr Amit Jaiswal, an assistant professor at the School of Basic Sciences, IIT-Mandi, said, "Keeping the urgency of the pandemic and cost-effectiveness in mind, we have developed a strategy to repurpose existing [personal protective equipments] PPEs, especially face masks, by providing an antimicrobial coating to these protective clothing/textiles." The materials used are reportedly 100,000 times smaller than the width of the human hair "to confer antimicrobial properties to polycotton fabric"[40][41].

V. CONCLUSIONS

In this paper, from the above-mentioned frameworks and study, we extract the consequences that science & technology such as IoT,AI and other can offer numerous benefits for sustainable development as form of smart hospitals such as low price, good reliability even in case of pandemics, wherein healthcare workers can avail most of these benefits even without coming in direct contact with infected people. With the new appearing facts day by day, they sustain noticing the demand for affordable management.

So, science and technology such as artificial intelligence, hardware, and software combindly make an efficient IoT based ecosystem for covid -19 which performs-Efficient and impressive monitoring and control, highly efficient track system, Stimulate diagnosis, and economical management for pandemic. It was acknowledged from the review that battling a worldwide pandemic depends intensely on information assortment which eventually brings about huge information.

This was featured as a significant test referring to protection and security worries in permitting IoT gadgets to gather individual information. But in present time privacy and security is less important than being alive.

REFERENCES

[1]. Ashami, H. , & M. Wegmuller, J. P. von der Weid, P. Oberson, and N. Gisin, "High resolution fiber distributed measurements with coherent OFDR," in *Proc. ECOC'00*, 2000, paper 11.3.4, p. 109.

[2]. Nuri, I. (2019). The reality of sustainable development in Iraq: Constraints, challenges and development strategies. Journal of Economic Sciences, 8, 2019.

[3]. Ismail, M. (2015). The role of investments in achieving sustainable development - Syria as a model (PhD thesis), University of Damascus, Syria.

[4]. Horton R. Offline: COVID-19 and the NHS – "a national scandal". Lancet. 2020 03 28;395(10229):1022. https://dx.doi.org/10.1016/S0140-6736(20)30727-3 PMID: 32222186

[5]. Bedford J, Enria D, Giesecke J, Heymann DL, Ihekweazu C, Kobinger G, et al.; WHO Strategic and Technical Advisory Group for Infectious Hazards. COVID-19: towards controlling of a pandemic. Lancet. 2020 03 28;395(10229):1015–18. https://dx.doi.org/10.1016/S0140-6736(20)30673-5 PMID:32197103

[6]. COVID-19 and sustainable development goals Kristin Heggen a, Tony J Sandset a & Eivind Engebretsen ba. Centre for

Sustainable Healthcare Education, University of Oslo, Klaus Torgaards vei 3, 0372, Oslo, Norway.b. Faculty of Medicine, University of Oslo, Oslo, Norway.Correspondence to Kristin Heggen (email: k.m.heggen@medisin.uio.no).

[7]. UNCTAD

[8]. Sustainable development: Meaning, history, principles, pillars, and implications for human action: Literature review Justice Mensah |Sandra Ricart Casadevall (Reviewing editor)Article: 1653531

[9]. | Received 26 May 2019, Accepted 26 Jul 2019, Accepted author version posted online: 14 Aug 2019, Published online:08 Sep 2019

[10]. Basiago, A. D. (1999). Economic, social, and environmental sustainability in development theory and urban planning practice: The environmentalist. Boston: Kluwer Academic Publishers 4th World Conference on Business, Economics and Management, WCBEM The objectives of sustainable development - ways to achieve welfare Dan Cristian Durana , Alin Artenea Luminita Maria Gogana
*,Vasile Durana a Politehnica University Timisoara, Management Faculty, 14 Remus str., 300191 Timisoara, Romania

[11]. Burlington Sustainable Development Committee

[12]. www.un.org/sustainabledevelopment/

[13]. https://www.un.org/sustainabledevelopment/poverty/

[14]. https://www.un.org/sustainabledevelopment/hunger/

[15]. https://www.un.org/sustainabledevelopment/health/

[16]. https://www.un.org/sustainabledevelopment/education/

[17]. https://www.un.org/sustainabledevelopment/gender-equality/

[18]. https://www.un.org/sustainabledevelopment/water-and-sanitation/

[19]. https://www.un.org/sustainabledevelopment/energy/

[20]. Chr.Von Zabeltitz (1994) Effective use of renewable energies for greenhouse heating. Renewable Energy 5:479-485.

[21]. https://www.un.org/sustainabledevelopment/economic-growth/

[22]. https://www.un.org/sustainabledevelopment/infrastructure- industrialization/

[23]. https://www.un.org/sustainabledevelopment/inequality/

[24]. https://www.un.org/sustainabledevelopment/cities/

[25]. https://www.un.org/sustainabledevelopment/sustainable-consumption- production/

[26]. https://www.un.org/sustainabledevelopment/climate-change/

[27]. https://www.un.org/sustainabledevelopment/oceans/

[28]. https://www.un.org/sustainabledevelopment/biodiversity/

[29]. https://www.un.org/sustainabledevelopment/peace-justice/

[30]. https://www.un.org/sustainabledevelopment/globalpartnerships/

[31]. Vaishya, Raju, et al. 2020 Artificial Intelligence (AI) applications for COVID-19 pandemic." Diabetes & Metabolic Syndrome: Clinical Research & Reviews.

[32]. Ray, Partha Pratim, et al. 2020 Blockchain for IoT-Based Healthcare: Background, Consensus, Platforms, and Use Cases." IEEE Systems Journal.

[33]. T. S. Barger, D. E. Brown, and M. Alwan. 2005 Healthstatus monitoring through analysis of behavioral patterns. IEEE Transactions on Systems, Man, and Cybernetics - Part A: Systems and Humans, 5(1):22–27. ISSN 1083-4427.

[34]. M. S. D. Gupta, V. Patchava, and V. Menezes. 2015 Healthcare based on IoT using raspberry pi. In 2015 International Conference on Green Computing and Internet of Things (ICGCIoT), pages 796–799.

[35]. **5**-Indian technology innovations developed during COVID-19 outbreak-THE HINDU

[36]. Milagrow introduces a new range of Robotic Vacuum cleaners in India- By: The Mobile Indian network, New Delhi

[37]. Application of IoT in Current Pandemic of COVID-19 To cite this article: Mukesh Kumar et al 2021 IOP Conf. Ser.: Mater. Sci. Eng. 1022 012063- IOP Conference Series: Materials Science and Engineering

[38]. Aarogyasetu.gov.in

[39]. Special Arrangement

[40]. https://www.thebetterindia.com/253262/iit-mandi-face-mask-covid19-virus-sars-cov2-filtering-self-cleaning-anti-bacterial-material-ppe- nanosheets-innovation-nor41/
[41]. economictimes.indiatimes.com/industry/healthcare/biotech/healthcare/i it-mandi-researchers-develop-a-slew-of-solutions-to-fight-covid-19/articleshow/79835337.cms?from=mdr
[42]. https://www.un.org/sustainabledevelopment/biodiversity/