

"Can Science Save Us?"

Thesis Statement:-

Science acts as a double-edged sword. But it provides more pros than cons to humanity. Science can obviously save humanity from drastic environmental impacts, health impacts, food and water insecurity etc. Only the right use of it is needed to be learnt.

1) Introduction

2) Science acts as a double-edged sword

2.1) Science can protect humanity from drastic effects

- a) Improved technology
- b) Reduced global challenges

2.2) Science will provide more benefits to humans in future

- a) Increased use of Robotics
- b) Enhanced quality of life

3) Science has protected human beings from various disasters

- a) Combating Climate Change
- b) Mitigating Natural Disasters
- c) Managing Global Pandemics
- d) Preventing Asteroid Impact

3.1) Science is helping in improved quality of life

- a) Providing Medical Advancements
- b) Diagnosing and Treating Diseases
- c) Ensuring Food Security
- d) Improving Agricultural Techniques

3.2) **The other side:-** Science can also cause negative impacts on us

- a) Increasing environmental degradation
- b) Enhancing cyber threats

4) Scientific usage of Japan; a best example to follow

- a) Disaster Preparedness and Mitigation
- b) Medicine and Biotechnology

4.1) Pakistan can also follow the strategy of Japan's scientific progress

4.2) Way forward to use scientific techniques effectively ..

a) Education and Research Development

b) Advancing Technology and Innovation

c) Strengthening Defense and Space Science

5) Conclusion

Essay:-

"Science knows no country, because knowledge belongs to humanity, and is the torch which illuminates the world" a famous quote by Louis Pasteur. Science can provide more advantages to humanity than the demerits. The increased use of the scientific technologies helps to tackle the climate change effects, natural disasters including earthquake, floods, tsunami, etc, and global pandemics etc. It can also address global challenges and improve the quality of life by providing healthcare technologies for preventing and treating different diseases and reducing the food and water insecurities by improving agricultural and irrigation techniques. The need of the hour is to learn the correct usage of scientific techniques in order to protect humanity in every field of life.

Science acts as a double-edged weapon because it provides positive impacts such as environmental sustainability, healthcare advancement and space exploration. But it also leads to negative impacts such as pollution, misinformation and cyber threats. So, it can be used for only positive purposes.

Science can protect humanity from drastic effects globally. It can improve the quality of life in various forms such as health, food, water, environment, space etc. For instance, the RAND Corporation's report evaluates various threats, including artificial intelligence, asteroid impacts, climate change, nuclear war and pandemics etc and emphasizes the importance of scientific understanding in developing effective mitigation strategies. So, science can contribute to less drastic effects of every disasters globally.

Science can defend humanity by the improved technologies. More efficient technology can lead to reduced national losses globally.

It can be proved by a study of Johns Hopkins Center for Health Security. This report explores technologies that can mitigate biological risks that with catastrophic global impacts. It underscores the need for scientific innovation in biosecurity. So, improved technology is the leading factor to protect humanity.

Additionally, science can protect human beings by reducing global challenges. Scientific research and technological advancements are pivotal in addressing global challenges. The United Nations Economic and Social Council emphasizes that science, technology and innovation are essential for overcoming global challenges. Therefore, to reduce global difficulties, science plays essential role.

Science will provide more pros in future as innovations are continue and modern technologies are inventing day by day. For instance, as solar and other renewable energy technologies advance, they can reduce global dependence on fossil fuels, mitigate climate change and make energy more accessible to underserved regions.

India's National Solar Mission aimed to deploy 100 GW of solar power by 2022, making it one of the largest solar projects in the world. In this way, future of science will be bright for humanity.

The field of Robotics will be more powerful in future. Robotics will continue to drive efficiency in manufacturing by automating routine tasks, ensuring consistent quality, and allowing human workers to focus on higher-level operations. For example, Tesla's use of robotics in its manufacturing processes has

transformed the automotive industry. The company uses robotic arms for tasks like welding, painting and assembly, significantly improving production speed and quality. Therefore, robotics will be more helpful in future.

Scientific technologies will enhance the quality of life more efficiently in future. Because the innovations in various fields continue to revolutionize healthcare at a large scale. For instance, biotechnology will continue to revolutionize agriculture, increasing food security and improving nutritional content. Genetically modified crops such as Bt. cotton have been developed to resist pests and improve yields. In this way, science will contribute in future also.

Science has protected always from various pandemics and natural disasters. COVID-19 is the best example to show that how scientific technologies are compatible for:

producing on-time response, treating COVID-19 affected patients and also introducing different vaccines to prevent this infection. Science has always contributed to protection of humanity.

Firstly, the scientific innovations are helpful to combat climate change. Understanding climate change, development of renewable energy, climate policies and global collaborations are the key ways in which science has helped. For example, advances in solar cell technology have made solar energy more efficient and wind turbines have also become more efficient to generate electricity. In 2020, wind and solar energy accounted for more than 20% of global energy production. In this way, climate can be preserved with the help of science.

Secondly, mitigating natural disasters is another advantage of science, by providing better understanding, early warning systems and improved

response strategies. The European Flood Awareness System (EFAS) uses weather data and hydrological models to predict floods days in advance, allowing authorities to warn communities at risk. So, scientific advances in hydrology have led to improved flood prediction models.

Additionally, the scientific advancements have contributed also in managing global pandemics. During the COVID-19 pandemic, scientific advancements in diagnostic testing allowed for rapid detection of virus. The Polymerase Chain Reaction (PCR) test became the gold standard for confirming COVID-19 cases. Therefore, science can contribute to prevent pandemics globally.

Moreover, asteroid impacts can also be prevented by scientific techniques in detection, monitoring and potential deflection technologies. For instance, the PAN-STARRS (Panoramic

Survey Telescope and Rapid Response System) project in Hawaii is one of the most advanced systems for spotting asteroids. So, science is helpful in this aspect too.

Science is contributing in the improvement of quality of life. As the modern inventions occur, scientific technologies immensely improve the quality of life across various aspects, from health and medicine to technology, environment and social development.

Among those improvement, the first one is that science is providing medical and healthcare advancements to humanity. Different vaccines, antibiotics and life-saving treatments are now available. The Polio vaccine, the HIV antiretroviral drugs and the development of insulin have transformed lives, helping to manage diseases and improving life expectancy. So, science can save humanity from different diseases.

The second improvement of science is to diagnosing and treating diseases timely. Technologies such as MRI (Magnetic Resonance Imaging), CT scans and X-rays have revolutionized diagnostic medicine. These tools help detect diseases early, allowing for quicker treatment and improving the outcomes. So, science is beneficial in this aspect too.

Next comes, the improvement in ensuring food security. Science plays a crucial role in it by improving the agricultural productivity, enhancing food quality and reducing waste. Scientific advancements in food preservation help extend the shelf-life of food. For instance, vacuum sealing and modified atmosphere packaging can extend the shelf-life of fruits, vegetables and meats. So, science is helpful in reducing food insecurity.

Last but not the least, agricultural techniques can be improved with the

help of science. Advances in technology, such as satellite imaging and soil sensors have enable farmers to practice precision and agriculture.

Therefore, scientific knowledge is necessary to improve agricultural practices.

But, on the other hand, science can also cause negative impacts for humanity. These effects includes environmental degradation, global pollution, hacking, misinformation, cyber threats, etc. So, the correct use of it is required.

One of the negative effects of scientific technology is the environmental degradation. The development of technologies i.e., the nuclear technology provides the risks associated with nuclear power plants, radioactive waste disposal and potential for nuclear weapons. For instance, the Hiroshima and Nagasaki Bombings in 1945 used nuclear weapons, leading

to immediate death and long-term radiation effects on survivors. So, it can be harmful also.

Similarly, the scientific knowledge contributes to cyber threats. The advancement of science, particularly in the fields of information technology, cybersecurity and artificial intelligence has significantly contributed to cyber threats. For instance, in 2020, a phishing attack targeted employees of Twitter, where hackers used social engineering tactics to gain access to high-profile accounts and hijack them to promote cryptocurrency scams.

Different countries in the world use scientific knowledge and technologies in a very efficient manner. For instance, Japan is known as one of the best countries to use scientific techniques correctly. Japan uses science in various effective ways.

Among these ways, first one is the disaster preparedness and mitigation. Japan has an effective earthquake-resistant infrastructure, tsunami warning systems and disaster robotics which address immediate climate changes and prepare response to mitigate the adverse effects. After the 2011 Tohoku earthquake and tsunami, Japan implemented stricter building codes and expanded tsunami defense systems. In this way, Japan has an efficient infrastructure to combat disasters.

Moreover, Japan made a rapid progress in medicine and biotechnology, also. Japan is at the forefront of stem cell research and regenerative therapies, developed innovative solutions regarding healthcare to extend healthy lifespans, and their companies lead in drug development for cancer, autoimmune disease and infectious diseases. A Japanese scientist, Shinya Yamanaka,

won the Nobel Prize for pioneering work on iPS cells, revolutionizing regenerative medicine. So, Japan has developed a very modern technology using scientific knowledge.

Pakistan can also follow the strategy of Japan and develop the best instruments and technologies for improving the quality of life and national progress. Because, Pakistan has a significant potential to use science effectively to address its challenges and accelerate national development.

Scientific techniques can be used effectively in different ways. The first among them is to invest in education and research development. Reforming the STEM education (science, technology, engineering and mathematics), funding in the research and development universities and creating incentives for talented scientists are the measures to

improve education and development. Initiatives like the Higher Education Commission's (HEC) research funding programs can be scaled up to support scientific innovation. So, it is the improvement way to use science effectively.

Additionally, advancing the technology and innovation is another way to improve scientific technology. Expanding the IT sector by investing in AI, machine learning and cyber security can boost exports. Pakistan's IT exports, driven by software and tech startups, have shown remarkable growth in recent years. So, this is also improvement step to use science effectively.

Last but not the least, strengthening defense and space science is also the way forward to use science in an efficient manner. For instance, expanding the role of SUPARCO

(Pakistan's space agency) in satellite development for communication, weather monitoring and defense is the best way for scientific advancements. In this way, humans can use science effectively.

To conclude, science has both pros and cons. But it has a brighter side more than its dark side. Science can save the humanity and can protectⁱⁿ various forms including preventing natural disasters, combating climate change and addressing global challenges etc. The need of the hour is to learn the correct usage of scientific techniques to accelerate national prosperity.