

SECTION

12

RELIGION,  
SCIENCE &  
TECHNOLOGY  
AND THE  
ENVIRONMENT



# RELIGION AND CONTEMPORARY ISSUES

## Religion and the Environment

### Introduction

In this section, you will explore the connection between religion, science, technology, and the environment. The focus of the section will be an objective assessment of science and technology's impact on environmental protection and conservation. You will also learn how religion can be harnessed to support the environmental protection and conservation agenda.

### At the end of this section, you will be able to:

- Examine how religious values can complement science and technology for the protection of the environment

### Key Idea

- Unfavourable climate conditions are a serious threat to human existence. Reversing the negative impact of climate change is not the sole responsibility of one area of study. It is a collective responsibility. In this light, science, a method of problem-solving that addresses problems and fosters critical thinking and open mindedness, and technology, the application of scientific findings can be complemented by religious and moral values when investigating how to address today's environmental challenges.

## SCIENCE AND TECHNOLOGY AND THE ENVIRONMENT

Science and technology are directly linked to each other. This section focuses on helping you to understand the relationship between science, technology and the environment.

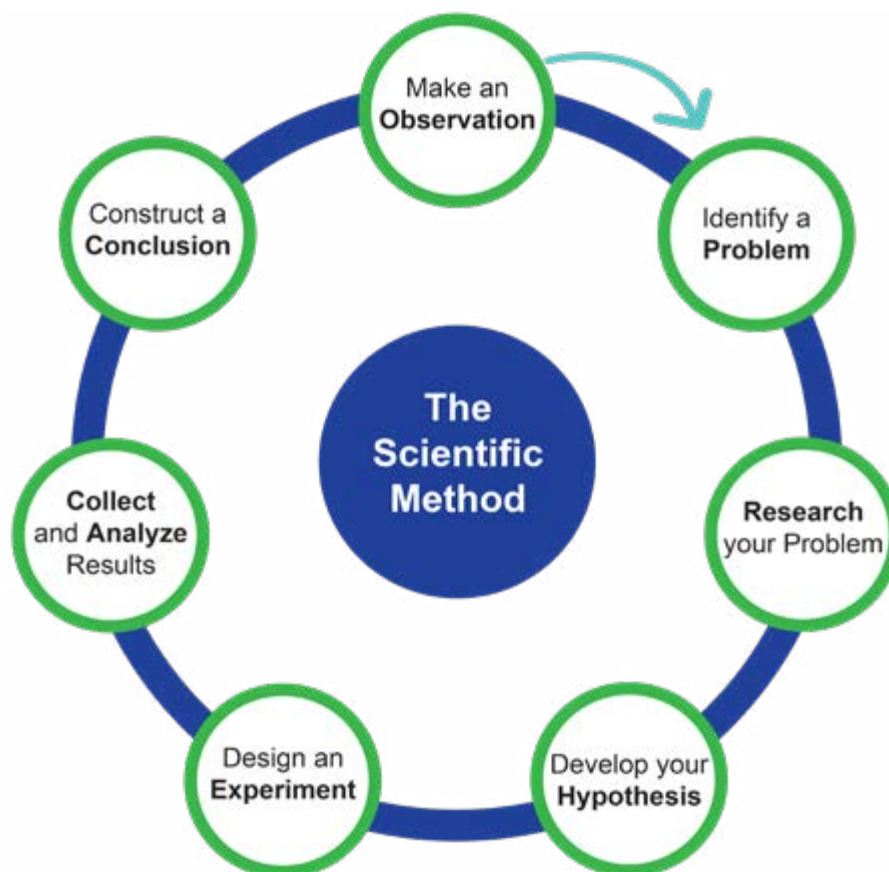
### What is science?

Science is a method of enquiry based on empirical data, objectivity, experimentation/ observation and verifiability. Science makes observations of the natural world to identify patterns, ask questions, find answers and ask more questions. It applies problem-solving methods logically and explores the world based on:

- Experience and observable facts through unbiased and objective investigation,
- Experimenting and closely observing concepts - Confirming results to assure correctness

Science helps us to understand the natural world by:

- Identifying trends and occurrences
- Posing questions to elicit responses
- Determining solutions via evidence-based reasoning
- Constantly pursuing new information and improving comprehension



**Fig. 12.1:** A diagrammatic representation of the scientific method

## What is technology?

Technology is the purposeful or deliberate use of scientific concepts, information and techniques to accomplish useful objectives to better the lives of people. It includes:

- Creating original answers to pressing issues in the real world.
- Modifying and altering the environment to suit the demands of human beings.
- Enhancing productivity, efficiency, and quality of life by developing devices, machinery, and systems.
- Using technological breakthroughs to explore and expand human capabilities.
- Improve the standard of living and well-being of people.
- Boost productivity and efficiency it enables us to change the way we work, live, and connect with the environment.



## Contribution of Science and Technology to environmental preservation

Science and technology have had many positive impacts on the physical environment, for example:

- Scientific research and AI applications enable us to:
  - » Better understand the planet's dynamics and ecosystems.
  - » Anticipate and predict environmental changes and challenges.
  - » Develop effective solutions to minimise human impact on the environment.
- Efficiently produce materials and reduce waste by:
  - » Implementing sustainable manufacturing processes
  - » Optimising resource utilisation
  - » Reducing carbon footprint and emissions
- Development and adoption of green technologies:
  - » Electric vehicles and renewable energy sources (solar, wind, hydro)
  - » Energy-efficient solutions and smart grids
  - » Sustainable infrastructure development.



**Fig. 12.2:** Example of clean energy - Solar Energy



**Fig. 12.3:** Environmentally friendly energy from Akosombo Dam

- Leveraging internet technologies for environmental awareness and research:
  - » Sharing research findings and data globally
  - » Raising public awareness about environmental issues and challenges
  - » Facilitating collaboration and knowledge-sharing among experts and stakeholders
- Preserving forests and natural resources:
  - » Reducing paper consumption and promoting digital documentation
  - » Utilising technology for remote monitoring and conservation efforts
  - » Promoting sustainable land-use practices and reforestation
- Supporting sustainable food production and land use:
  - » Scientific discoveries and technologies for efficient agriculture
  - » Precision farming and vertical farming
  - » Sustainable water management and irrigation systems
- New technologies and innovations for environmental preservation such as:
  - » Biodegradable materials and waste management solutions
  - » Climate-resilient infrastructure and urban planning
  - » Eco-friendly packaging and supply chain management

### Activity 12.1

Engage with an expert to discuss the contributions of science and technology to environmental protection and conservation. Such a person could be a scientist or staff from the Environmental Protection Agency or any other person knowledgeable on the subject matter.

Alternatively, your teacher may invite a suitably qualified person to present to the class. Prior to the visit, compose questions to ask them as part of the discussion.

**Table 12.1:** Questionnaire

1.	How has scientific research informed environmental policy and decision-making?
2.	How has technology helped monitor and mitigate the effects of climate change?
3.	What role do you think renewable energy sources play in reducing our carbon footprint?
4.	
5.	

### Activity 12.2

Work in small groups of four or five – try to make sure that across the group you include classmates of different genders and religion

Carry out research to identify five contributions of science and technology to environmental protection and conservation.

Summarise your findings in a group report which may be in the form of a brief presentation, poster or written essay.

### Activity 12.3

Using the internet, watch videos on how science and technology support environmental protection. Make notes on the key points raised in each video. The following links may be helpful.

<a href="https://www.youtube.com/watch?v=JWTVtYEeJic">https://www.youtube.com/watch?v=JWTVtYEeJic</a>	
<a href="https://www.youtube.com/watch?v=IPddkbeY9og">https://www.youtube.com/watch?v=IPddkbeY9og</a>	
<a href="https://www.youtube.com/watch?v=SN4hQUAi8kE">https://www.youtube.com/watch?v=SN4hQUAi8kE</a>	
<a href="https://www.youtube.com/watch?v=FIYVnvHa2dc">https://www.youtube.com/watch?v=FIYVnvHa2dc</a>	

## CHALLENGES IN USING SCIENCE AND TECHNOLOGY ALONE TO SOLVE ENVIRONMENTAL PROBLEMS

This section aims to help you understand the challenges of using science and technology alone to solve environmental problems and consider how integrated approaches to addressing current environmental problems can be applied in your community and beyond.

### Negative impact of scientific and technological activities on the environment

Science and technology have improved human livelihood, but this has not been without effect on the natural environment. Some of the ways in which these advances have affected the environment are listed below:

1. **Pollution:** Scientific and technological innovations to increase productivity has led to different types of pollution including air, water, noise and heat pollution.
2. **Air pollution:** Technology has contributed to the emission of toxic gases and particulates into the atmosphere, which reduces air quality. This has an adverse effect on both the environment and human health.
3. **Water pollution:** The use of technology and industrial operations can contaminate water supplies, endangering aquatic life as well as human health.
4. **Noise pollution:** Excessive noise produced by industrial plants and automobiles can disturb human settlements and ecosystems.
5. **Heat pollution:** The usage of technology and industrial operations can emit surplus heat, which exacerbates urban heat islands and accelerates climate change.

## Science and technology consume resources which are non-renewable, e.g., gold, uranium, iron and bauxite

Science and technology are dependent on finite resources such as bauxite, iron, uranium, and gold. Many means of extraction of these resources are environmentally unfriendly meaning that the local communities and environment may suffer as a result.

- a. Manufacturing technology creates waste
  - i. **Electronic waste:** The production and disposal of electronic equipment can produce hazardous waste, which contaminates the environment and living things.
  - ii. **Non-biodegradable waste:** Technology can create waste that is not biodegradable, which can damage ecosystems and linger in the environment.
  - iii. **Chemical waste:** chemicals and their by-products, which can have harmful effects on the environment, human health, and wildlife, such as medical waste (chemicals used in medical treatments, such as pharmaceuticals and disinfectants), destroy the environment.
- b. Disrupting ecology: The term “ecological disruption” describes how human activity affects an ecosystem’s natural balance and results in changes to the climate, biodiversity, and environment. Using pesticides and weedicides can have a significant negative impact on the environment’s natural cycles. Natural habitats of plants and animals are destroyed through industrial processes, infrastructural growth, and technology use. This disturbs the ecosystem and biodiversity.
- c. Carbon emissions from carbon dioxide and monoxide produced out of scientific knowledge and technological advancement has led to the emission of greenhouse gases that cause global warming. It must be noted that advancement in science and technology led to the rise in emissions of carbon dioxide and monoxide, which are directly linked to climate change and global warming. Unchecked carbon emissions can lead to rising temperatures, altered weather patterns, and disrupt ecosystems.





**Fig. 12.4:** Burning of fossil fuel to generate energy.

## Weaknesses of using science and technology alone in environmental protection

The following highlights the limitations and potential drawbacks of science and technology alone in environmental management. It emphasises the need for a more holistic and values-driven approach that prioritises environmental sustainability and social equity:

- a. Science and technology have the knowledge and skills, but they often lack the values to use this knowledge for the good of all people. Science and technology are neutral; they don't have personal opinions or biases. However, this neutrality can be a problem because it means that scientists may prioritise knowledge over ethics or considering the needs of vulnerable communities. This can lead to scientific advances that harm society and the environment.
- b. Science and technology can look at the world as a resource to be used for human gain rather than seeing nature as valuable in itself. This way of thinking can harm the earth and lead to:
  - Using up natural resources too quickly
  - Damaging the environment

This happens because science and technology focus on short-term benefits, rather than thinking about the long-term effects on the planet.

- c. Science and technology can create more environmental problems in trying to solve human problems. Examples include unforeseen side effects of genetic engineering namely;
  - i. The development of crops to withstand against pesticides, which creates “superweeds” that are hard to stop.
  - ii. Genetically modified farmed fish breeding with wild fish, changing the environment.

- iii. Changing bacteria to make fuel, but this has unexpected effects on life in the soil.
- iv. Environmental degradation from resource extraction.
  - » Damaging the environment by taking too much water, trees, or minerals from the earth.
  - » Releasing harmful chemicals into the air and water from factories and industries in the process of adding value to the natural resources extracted.
- v. Chemical pollutants from industrial processes; during industrial processes like the manufacture of plastics, textiles, extraction of minerals, crude oil drilling and refining, mineral extraction and processing, power generation and chemical production; harmful substances are released into the environment. These examples show how scientific solutions to human problems can give rise to new environmental issues.
- d. Science and technology are overly focused on material prosperity, which may go against the sustainable use of the environment. They put financial prosperity and economic expansion ahead of social justice and environmental sustainability. This emphasis may result in:
  - i. Excessive usage of resources
  - ii. Degradation of the environment
  - iii. Growing disparities in social and economic status
- e. Some international scientific research, particularly in the area of environmental protection, ignores the United Nations' sustainable development goals. Rather, the interests of a small number of strong corporations and governments in developed nations frequently drive research. It follows that research priorities are misaligned because they prioritise profit over the welfare of society and the environment. Rich nations put economic expansion ahead of all other considerations, disregarding the needs and viewpoints of developing nations; indigenous peoples; and next generations. This is problematic because it indicates that research is prioritising financial gain for a small number of powerful groups over addressing pressing issues like environmental protection.

### Activity 12.4

Working with your classmates, form a group of at least ten people. Create a mock parliamentary debate on a bill to decide on the implementation of advanced scientific technology designed to improve environmental protection.

Assign roles among yourselves based on the abilities and interests of your group members such as:

- Two or three members should take up roles such as Clerk of Parliament or media persons to record and videotape proceedings.

- Some members of the group should take up roles like Members of Parliament to debate the motion in favour of their constituents.
- One of you should take up the role of Speaker of Parliament, controlling affairs and managing debates.

Consider different viewpoints and motivations.

Remember the guidelines for debate:

- Respectful dialogue and open-mindedness
- Present evidence-based arguments
- Use clear and concise language.
- Allow everyone the time and space to contribute.

### Activity 12.5

Arrange to speak with someone to discuss the weakness of using science and technology alone to promote environmental protection and conservation. Such a person could be a scientist, a member of staff from the Environmental Protection Agency (EPA) or any other person knowledgeable in the subject matter.

Alternatively, your teacher may arrange for a suitably qualified person to present to the class. Prior to the visit, compose questions to ask as part of the discussion. You may show them to your teacher for validation.

For example:

**Table 12.2:** Questionnaire

S/N	Question	Response
1.	In what way has science and technology failed to promote environmental protection and conservation?	

### Activity 12.6

Search online for information on the weaknesses of science and technology in addressing environmental problems. Your teacher may provide you with specific questions to answer as part of the exercise.

Write your findings in your notebook and share it with your classmates.

## INTEGRATING RELIGIOUS VALUES INTO SCIENCE AND TECHNOLOGY TO SOLVE ENVIRONMENTAL PROBLEMS

The focus of this section is to help you appreciate how integrating religious values into science and technology can support in solving environmental problems.

### The complementary role of religion in environmental protection:

#### Moral and ethical guidance or moral and ethical direction

Religious teachings provide a moral framework that acknowledges the sanctity and intrinsic worth of nature, promoting a strong feeling of stewardship, reverence, and care for the planet. Nature in itself is good and must be maintained as such.

This moral direction can supplement scientific information in the following ways:

- i. Giving people a sense of accountability and responsibility for how their actions affect the environment
- ii. Including moral and ethical concerns when making decisions about the environment
- iii. Promoting sustainable lifestyles and actions that put the health of the environment and future generations first
- iv. Promoting a sense of reciprocity and connectivity between people and the natural environment
- v. Providing a long-term view that goes beyond immediate benefits and considers the possible effects of human behaviour.

For example, African Indigenous Religions emphasises the responsibility to preserve nature, and the significance of coexisting peacefully with it. Christianity on the other hand indicates that human beings must take care of creation, while in Islam, humans are the “khilafah,” or guardianship of the planet.

#### Community engagements:

Religious institutions serve as hubs for community engagement and activism. They can mobilise their members to participate in environmental initiatives such as clean-up campaigns, tree-planting projects and advocacy efforts. Religious organisations are essential to community activism and involvement because they use their networks and influence to encourage environmental stewardship.

They can organise their members to take part in a range of environmental initiatives, including:

- i. Coordinated campaigns to clean up public parks, waterways, and public spaces.
- ii. Tree planting and reforestation projects.



- iii. Campaigns to advocate for changes to environmental policies and laws
- iv. Community education initiatives to promote sustainable practices and environmental awareness.
- v. Partnerships with local businesses and organisations on environmental projects

Religious organisations also;

- Foster a feeling of belonging and a common goal among their followers, which inspires cooperation in the pursuit of environmental objectives.
- Provide facilities and resources for environmental activities.
- Offer spiritual advice and support for environmental advocacy.
- Encourage collaborations with secular and other faith-based organisations to strengthen environmental initiatives
- Promote knowledge sharing and intergenerational involvement on environmental concerns
- They create environmental initiatives and programs for age-specific audiences, such youth or senior programs.

### Simplicity and moderation:

Religious values often promote principles of simplicity, moderation and conservation. These values align with sustainable living practices such as reducing consumption, minimising waste and conserving resources.

These values encourage people to:

- i. Adopt a minimalist lifestyle, concentrating on what is truly necessary.
- ii. Avoid excess and overconsumption.
- iii. Practice mindful consumption and take the environment's impact of purchases into consideration.

Among the religious doctrines that advocate for moderation and simplicity are:

- **AIR** - God has provided enough for everyone needs and not for everyone greed.
- **Christianity** - Sell your possessions and give to the poor (an indication of detachment from material things in order to become a follower of Christ).
- **Islam** - Do not be wasteful.

By blending sustainable living practices with religious principles, people can consume less and use resources with more care.

### The value of stewardship:

Religious narratives and scriptures often depict humanity's role as stewards of the earth. These stories can inspire individuals to develop a deeper connection with nature and to take responsibility for its care and protection.

These stories and teachings can inspire individuals to:

- i. Develop a sense of responsibility and accountability for the earth's well-being
- ii. Cultivate a deeper connection with nature and appreciate its sacredness
- iii. Recognise the interconnectedness of human and natural systems



**Fig. 12.5:** A young religious lady planting a tree as her way of reconnecting to nature

- iv. Adopt a long-term perspective, considering the impact of their actions on future generations
- v. Embrace their role as caretakers and guardians of the earth

Examples of religious teachings on stewardship include:

*Take care of the earth and it will take care of you (AIR). Adam by extension and the entire human race are caretakers of the earth (Genesis 2:15). God has appointed human beings as stewards on the earth (Quran 35:39).*

By accepting the importance of stewardship, people can:

- Create a deeper sense of meaning and purpose in their interactions with the natural world.
- Act to slow down environmental damage and advance sustainability.
- Encourage others to take up environmental stewardship.
- Foster appreciation and wonder for the natural world.
- Acknowledge the intrinsic value of nature, which goes beyond its functional or utilitarian value.

### Interdisciplinary collaboration:

Collaboration between religious leaders, scientists, policymakers and technologists can foster interdisciplinary approaches to environmental problem-solving:

**Below is a Joint Appeal Executive Summary of World Religious Leaders and Scientists at pre-COP26 reported by UN Climate Change News, 5 October 2021**

*“Today, after months of dialogue between faith leaders and scientists, we come together united to raise awareness of the unprecedented challenges that threaten our beautiful common home. Our faiths and spiritualities teach a duty to care for the human family and for the environment in which it lives. We are deeply interdependent with each other and with the natural world. We are not limitless masters of our planet and its resources. Multiple crises facing humanity are ultimately linked to a crisis of values, ethical and spiritual. We are caretakers of the natural environment with the vocation to care for it for future generations and the moral obligation to cooperate in the healing of the planet. We must address these challenges using the knowledge of science and the wisdom of religion. We must think long-term for the sake of the whole of humanity. Now is the time to take transformative action as a common response” (UN Climate Change News, 2021).*

This is an example of how religious leaders, scientists, technologists, and policymakers can work together to:

- i. Promote a comprehensive understanding of environmental issues by integrating spiritual, scientific, and social perspectives.
- ii. Create sustainable solutions that tackle the underlying causes of environmental problems.
- iii. Encourage communication and information exchange between disciplines (study areas) to improve problem-solving skills.
- iv. Encourage the creation of technologies that put environmental stewardship and sustainability first.

Advantages of transdisciplinary teamwork:

- A thorough comprehension of environmental concerns
- Creative fixes that consider several facets of an issues
- Greater public awareness and participation - better policy choices
- Creation of environmentally friendly technology

Other examples of interdisciplinary cooperation include;

- The Interfaith Centre for Sustainable Development, which convenes environmental specialists and religious leaders.
- The Forum on Science and Religion, which promotes communication between scientists and religious academics.
- The Interfaith Centre for Sustainable Development, which unites religious leaders and environmental specialists.
- The Environment Programme of the United Nations, which works with governments, non-governmental organisations, and religious institutions,

The Green Faith project, which blends environmental advocacy with religious leadership. Together, scientists, technologists, politicians, and religious leaders can take up tackle environmental concerns by providing solutions that put the sustainability of the environment and human well-being first, encourage the next generation of stewards and leaders in the environment, encourage a sense of collective accountability and optimism for the future.

### Activity 12.7

Arrange to meet with religious persons, scholars and environmental scientists to explore the intersection between faith traditions and environmental stewardship. Alternatively, your teacher may convene a group to come and present to the class.

Before the meeting prepare a set of questions to ask as part of the discussion.

**Table 12.3:** Questionnaire

1.	
2.	
3.	

### Activity 12.8

Form a small group with three or four classmates of different religious affiliations and gender. Research and design a community-based environmental action project that integrate scientific knowledge with religious teachings on compassion, empathy and service to others. Examples might include tree planting initiatives, clean up campaigns etc.

Collaborate with local religious institutions to implement your project to address to address environmental issues while fostering social cohesion and collective responsibility.

Before you begin:

- a. Identify potential environmental problems facing the community.
- b. Prescribe practical learner-led solutions to environmental problems facing the community
- c. Solicit collaboration with other organisations and stakeholders to implement solutions to environmental problems facing the community.

Present the results of your project to your class for discussion and feedback.



### Activity 12.9

Working independently, search online for information on integrating religious values into science and technology to solve environmental problems. Make notes on your research and summarise three initiatives that you have read about.

Your teacher may provide you with specific questions to answer as part of the exercise.

Share your work with a classmate for feedback and discussion.

### Self-Assessment Questions 12.1

Answer at least one of the following questions to review your learning from this section.

1. Identify three contributions of science and technology to environmental protection.
2. Explain three contributions of science and technology to environmental protection.
3. Justify the contribution of science and technology to environmental protection in Ghana.

### Self-Assessment Questions 12.2

Answer at least one of the following questions to review your learning from this section.

1. Outline three weaknesses of science and technology in solving environmental problems.
2. Explain three weaknesses of science and technology in solving environmental problems.
3. Assess the impact of science and technology in solving environmental problems.

### Self-Assessment Questions 12.3

1. Identify three religious values that can complement science and technology for environmental protection.
2. Explain three religious values that can complement science and technology for environmental protection.
3. Assess the effectiveness of three religious values in complementing science and technology for environmental protection.

# Review Questions

1. How will you apply the contributions of science and technology to environmental protection and conservation in your community?
2. Analyse religious values that can address weaknesses in science and technology's inability to address environmental problems.
3. How will you integrate any four religious values in solving environmental problems in your locality?

## Extended Reading:

1. Religious leaders and scientists unite in the fight against climate change
2. <https://unfccc.int/news/world-religious-leaders-and-scientists-make-pre-cop26-appeal>
3. Religion and science- [Stanford Encyclopaedia of Philosophy](#)
4. [https://plato.stanford.edu > entries > religion-science](https://plato.stanford.edu/entries/religion-science)

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