

# Use of Innovation towards Sustainable Environment Growth

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## Abstract:

Innovation is key to solving environmental problems and supporting sustainable growth. It helps tackle climate change, use resources more efficiently, and create systems that are good for the environment. This includes renewable energy, recycling, sustainable farming, green technologies, and policies that protect nature.

Renewable energy innovations, like better solar panels, wind turbines, and energy storage, make clean energy cheaper and more reliable, reducing our reliance on fossil fuels. Recycling technologies, biodegradable materials, and AI-based waste sorting turn waste into useful resources, making better use of materials and cutting down pollution. Sustainable farming, with techniques like precision farming, vertical farming, and genetically modified crops, helps ensure enough food is produced with fewer resources and less environmental damage. Green technologies, such as energy-efficient appliances, electric vehicles, and eco-friendly building materials, reduce our carbon footprint.

Policies like carbon pricing, green financing, and data-driven decision-making encourage sustainable practices. Digital tools like AI, blockchain, and IoT help manage resources better and make supply chains more transparent. Social innovations, such as community-led projects and educational programs, help people adopt eco-friendly habits and push for environmental protection.

Although challenges like high costs and resistance to change exist, cooperation between governments, businesses, and communities can help overcome them. By combining technological, social, and policy innovations, we can build a sustainable future that benefits both people and the planet. Innovation is essential to achieving environmental sustainability and tackling today’s global challenges

**Keywords:** Environment, Innovation, Sustainable Growth.

## Introduction:

Innovation has become crucial in tackling serious environmental issues and promoting sustainable growth. With climate change, shrinking natural resources, and a growing global population, innovation offers ways to reduce environmental damage, improve resource use, and build sustainable systems. It covers areas

like renewable energy, recycling, sustainable farming, green technologies, and environmental policies. These innovations not only aim to lower the environmental impact but also support economic and social well-being, laying the foundation for a sustainable future.

One of the biggest changes innovation has brought is in renewable energy. Solar, wind, and hydroelectric power have become more efficient and affordable due to new technologies. For example, better solar panels and wind turbines have reduced the cost of renewable energy, making it competitive with fossil fuels. Also, improvements in energy storage, like lithium-ion and solid-state batteries, help solve issues with renewable energy's availability. These advancements not only reduce greenhouse gas emissions but also lessen our dependence on non-renewable resources, paving the way for a cleaner future.

In waste management, the circular economy is gaining popularity as a sustainable approach. Unlike the old "take, make, dispose" model, the circular economy focuses on reusing, recycling, and regenerating products and materials. Innovations like advanced recycling methods, biodegradable materials, and upcycling turn waste into useful resources. For example, chemical recycling can break down plastics for reuse without losing quality, and AI in waste sorting makes recycling more efficient, reducing waste and creating economic opportunities.

Sustainable agriculture is another area where innovation is making a big difference. With the world's population expected to reach 10 billion by 2050, ensuring food security with minimal environmental impact is crucial. Innovations like precision farming, vertical farming, and genetically modified crops are changing how food is produced. Precision farming uses technologies like GPS, drones, and sensors to monitor crops, soil, and water usage, improving efficiency and reducing the need for excessive water, fertilizers, and pesticides. Vertical farming, which grows crops in stacked layers in controlled spaces, is ideal for urban areas with limited land. These farms use less water and land, while producing fresh food year-round. Genetic engineering has also produced crops that resist pests, diseases, and extreme weather, reducing the need for chemicals and improving resilience to climate change.

Green technologies, such as energy-efficient appliances, electric vehicles (EVs), and eco-friendly building materials, also play a key role in promoting sustainability. EVs, for example, are becoming more popular thanks to improvements in battery technology and charging infrastructure. Modern EVs are more affordable, have longer ranges, and charge faster, making them a practical alternative to traditional cars. In construction, sustainable materials like recycled steel and low-carbon concrete help reduce buildings' environmental impact, while smart technologies improve energy efficiency.

Innovation in environmental policies is also vital for promoting sustainability. Governments and organizations are using data-driven decision-making, partnerships, and new financing methods to tackle environmental issues. For example, carbon pricing systems like carbon taxes encourage businesses to cut emissions by making pollution costly. Digital tools help monitor and verify environmental data, ensuring transparency. Public-private partnerships and green financing initiatives, such as green bonds, fund sustainable projects and technologies, creating an environment that supports sustainable practices.

Digital technologies like AI, blockchain, and the Internet of Things (IoT) are also changing how we monitor and reduce environmental impact. AI tools analyze large amounts of data to find patterns and predict outcomes, while blockchain helps track sustainable practices in supply chains. IoT devices, like smart sensors, allow real-time monitoring of environmental conditions, helping industries and individuals make informed decisions to reduce their environmental impact.

Social innovation, through community-led projects and awareness campaigns, also plays a vital role in environmental sustainability. Programs promoting reforestation, waste reduction, and water conservation show how local actions can have big environmental and social benefits. Education and awareness initiatives help people adopt sustainable lifestyles and advocate for the environment.

Although innovation has brought about significant progress, challenges like high costs, lack of infrastructure, and resistance to change still remain. Overcoming these requires effort from governments, businesses, and society. Investments in research, supportive policies, and awareness campaigns are needed to overcome these barriers and speed up the shift to a sustainable future.

Innovation is a powerful tool in addressing environmental challenges. From renewable energy and recycling to sustainable farming and green technologies, innovation offers solutions to create a more sustainable and fair world. By combining technological, social, and policy innovations, we can reduce our environmental impact, use resources efficiently, and build systems that benefit both people and the planet. While the journey to sustainability is challenging, with innovation leading the way, it is a path worth following for the well-being of future generations.

#### **Objectives:**

1. To understand the meaning of innovation and environmental sustainability.
2. To study various innovative measures taken in general towards environmental growth and sustainability.
3. To know innovative steps of entrepreneurs in Nashik City towards environmental growth and its sustainability.

#### **Scope & Limitations:**

1. This study is restricted upto Nashik City only.
2. 2022 to 2024 is the period which is taken for this study.
3. This study is not limited to the size of the organization. Entrepreneur who is self-employed, micro, small or large size of business is considered for this study.

#### **Sources of Data Collection:**

Both primary and secondary sources of data is considered for this research paper.

Primary data is collected from entrepreneurs through questionnaire, observation and personal discussion.

Whereas secondary sources of data is collected from various sources like books, magazines, authentic websites etc.

### Sampling Technique and Data Analysis:

Random sampling is done while selecting sample size. Sample of 1.50 percent i.e. 31 entrepreneurs is selected out of total 5024 population of entrepreneurs. For this DIC data is taken for consideration. Data analysis is done with the help of percentage and graphical tools.

### Hypothesis:

‘Optimum innovative measures have taken by entrepreneurs for environmental growth and its sustainability.’

### Innovation and Environmental Sustainability:

#### Innovation:

Innovation refers to the process of introducing new ideas, methods, or products that create value and address specific needs. It involves not just the creation of something new but also the improvement or adaptation of existing concepts to solve problems, enhance efficiency, or improve quality. Innovation can occur across various fields, including technology, business, healthcare, and education, and often stems from a desire to meet changing consumer demands or to gain a competitive advantage. Unlike invention, which focuses on the discovery of something entirely original, innovation emphasizes the practical application and commercialization of ideas to make them accessible and beneficial to a wider audience. For example, the smartphone was an innovation that combined several existing technologies, revolutionizing communication and daily life. At its core, innovation is a driving force behind progress, fostering creativity and adaptability to shape a better and more sustainable future. Understanding importance of innovation several definitions of "innovation" is provided by various authors and experts:

1. **Joseph Schumpeter (1934):** "Innovation is the introduction of new goods, new methods of production, the opening of new markets, the conquest of new sources of supply, and the implementation of new forms of organization."
2. **Peter F. Drucker (1985):** "Innovation is the effort to create purposeful, focused change in an enterprise's economic or social potential."
3. **Everett M. Rogers (Author of *Diffusion of Innovations*) (1990):** "Innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption."
4. **Michael Porter:** "Innovation is the central issue in economic prosperity, involving the ability to translate ideas into tangible solutions that create value for customers and society."
5. **Merriam-Webster Dictionary:** "Innovation is the introduction of something new; a new idea, method, or device."
6. **Oxford English Dictionary:** "Innovation is the action or process of innovating; a new method, idea, product, etc."

7. **Clayton M. Christensen** (Author of *The Innovator's Dilemma*) (1997): "Innovation is the process by which an organization transforms labor, capital, materials, and information into products and services of greater value."
8. **Anthony D. Williams and Don Tapscott** (Authors of *Wikinomics*) (2006): "Innovation is the application of better solutions that meet new requirements, unarticulated needs, or existing market needs."

### Environmental Growth

1. **M.A. Khalid** (2008): "Environmental growth refers to the expansion and improvement of ecological systems in a way that promotes biodiversity, supports natural processes, and ensures a harmonious balance between development and environmental conservation."
2. **Pearce, Markandya, and Barbier** (1989): "Environmental growth implies economic and social development that incorporates ecological improvement and ensures that natural resources are enhanced, rather than depleted, over time."

### Environmental Sustainability

1. **Definition by the Brundtland Commission** (1987): "Environmental sustainability is the practice of ensuring that natural resources are used to meet present needs without compromising the ability of future generations to meet their own needs."
2. **Definition by John Elkington** (1997): "Environmental sustainability is one of the three pillars of sustainable development, focusing on the responsible use and management of natural resources to prevent environmental degradation while fostering economic and social progress."
3. **Definition by Andrew Dobson** (1996): "Environmental sustainability emphasizes the long-term maintenance of ecological integrity, ensuring that human activities do not lead to irreversible damage to ecosystems."
4. **Definition by Robert Goodland** (1995): "Environmental sustainability is the ability to maintain the qualities that are valued in the physical environment, ensuring the natural capital stock remains constant over time."

### Innovative Measures for Environmental Sustainability

1. **Renewable Energy Advancements** (REN21, 2023)
  - **Description:** Innovations in solar, wind, and hydrogen technologies, such as floating solar farms and offshore wind turbines.
  - **Impact:** Reduces reliance on fossil fuels and cuts greenhouse gas emissions.
  - **Example:** The world's largest floating solar farm in China.
2. **Carbon Capture and Storage (CCS)** (International Energy Agency (IEA), 2022)
  - **Description:** Technologies that capture CO<sub>2</sub> emissions from industrial processes and store them underground.
  - **Impact:** Helps mitigate climate change by reducing atmospheric carbon.

- **Example:** Climeworks' direct air capture plant in Iceland.
- 3. **Circular Economy Practices** (Ellen MacArthur Foundation, 2021)
  - **Description:** Recycling waste materials into new products to minimize resource use and waste.
  - **Impact:** Reduces environmental degradation and promotes sustainable consumption.
  - **Example:** Adidas' sneakers made from recycled ocean plastics.
- 4. **Smart Water Management** (Xylem Inc., 2022)
  - **Description:** IoT-based systems to monitor water usage, prevent leaks, and ensure efficient distribution.
  - **Impact:** Addresses water scarcity and promotes sustainable water use.
  - **Example:** Xylem's smart water technologies.
- 5. **Green Buildings** (UNEP, 2021)
  - **Description:** Use of sustainable materials, energy-efficient systems, and vertical gardens in construction.
  - **Impact:** Reduces carbon footprint and improves urban sustainability.
  - **Example:** Bosco Verticale in Milan, Italy, integrates greenery into urban architecture.
- 6. **Sustainable Agriculture Technologies** (FAO, 2022)
  - **Description:** Vertical farming, precision agriculture, and hydroponics to grow food with minimal resources.
  - **Impact:** Reduces water use, land requirements, and chemical inputs.
  - **Example:** AeroFarms in the U.S. is a pioneer in vertical farming.
- 7. **Biodegradable Materials** (European Bioplastics, 2023)
  - **Description:** Development of bioplastics and packaging made from natural substances like algae or cornstarch.
  - **Impact:** Reduces pollution caused by conventional plastics.
  - **Example:** Notpla's seaweed-based packaging for food.
- 8. **Electric Mobility Solutions**
  - **Description:** Expansion of electric vehicles (EVs), e-bikes, and EV charging infrastructure.
  - **Impact:** Reduces urban air pollution and greenhouse gas emissions.

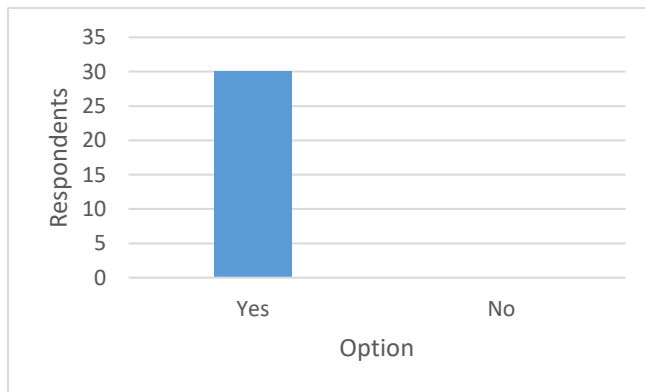
### **Environmental Sustainable Growth and Nashik City:**

Since many decades Nashik is one of the favourite spot for many people. It is because of its pleasant environment and spiritual background. On the other side, Nashik city is also getting developed due to its industrialisation. This may effect on environment in Nashik. Understanding this following study is tried to conduct.

**Table 1: Environment in Nashik is changing and Need to have some measures to make it better.**

| Option | Respondents | Percentage |
|--------|-------------|------------|
| Yes    | 31          | 100%       |
| No     | 00          | 00%        |
| Total  | 31          | 100%       |

**Graph 1: Environment in Nashik is changing and Need to have some measures to make it better.**

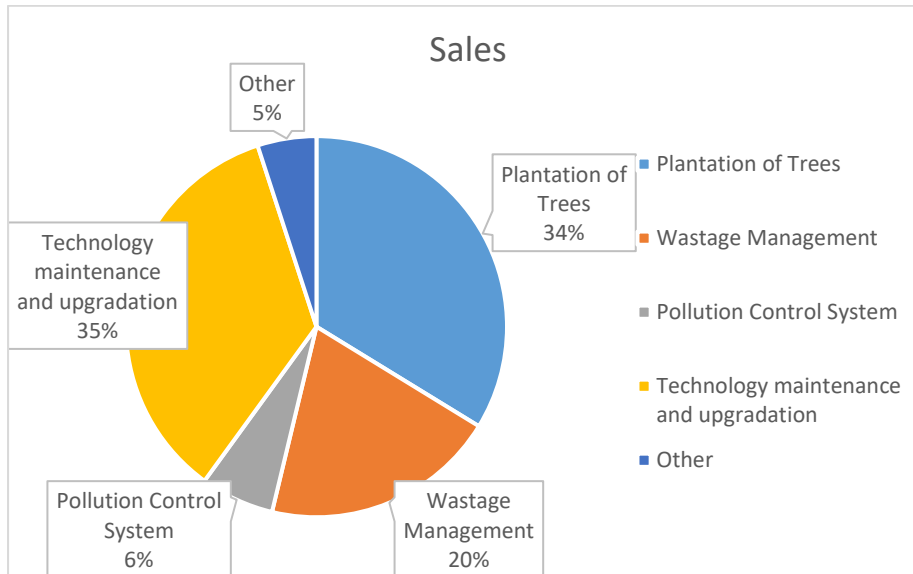


All respondents are in favour to implementation of some measure to protect environmental growth. These respondents are also agree that environment in the Nashik is changing and pollution in the city is increased.

**Table 2: Measures Taken for Environmental Growth and Sustainability**

| Option                                 | Respondents | Percentage |
|----------------------------------------|-------------|------------|
| Plantation of Trees                    | 27          | 33.75%     |
| Wastage Management                     | 16          | 20%        |
| Pollution Control System               | 5           | 06.25%     |
| Technology maintenance and upgradation | 28          | 35%        |
| Other                                  | 4           | 5%         |
| Total                                  | 80          | 100.00%    |

**Graph 2: Measures Taken for Environmental Growth and Sustainability**

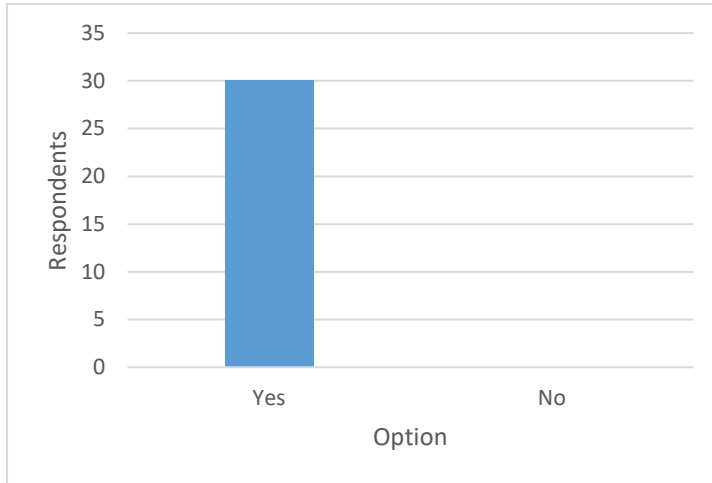


Question asked to respondents were multi choice pattern question. Respondents who were doing many task ticked one or more than option. According to above chart, Technology maintenance and upgradation is highest ticked option and after that plantation of tree is stood on second rank. Technology upgradation and maintenance also includes machinery related works which cannot be avoid for upgradation. Plantation of trees is possible for many respondents because of the space available at their location. Waste management includes waste management out of the processing of products and management of waste created by employee's daily activity.

**Table 3: Regular Checks on above activities to observe it regularly.**

| Option | Respondents | Percentage |
|--------|-------------|------------|
| Yes    | 31          | 100%       |
| No     | 00          | 00%        |
| Total  | 31          | 100%       |

**Graph 3: Regular Checks on above activities to observe it regularly.**

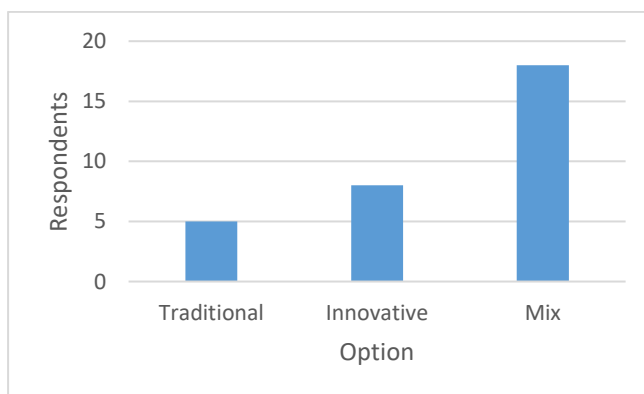


Purpose of asking this question is to analyses whether regular follow-up of environmental related activities are done or not. Almost all respondents follow some kind of system in which regular interval of check is done.

**Table 4: Requirement of type of Measure for future environmental sustainability.**

| Option      | Respondents | Percentage |
|-------------|-------------|------------|
| Traditional | 5           | 16.12%     |
| Innovative  | 8           | 25.80%     |
| Mix         | 18          | 58.06%     |
| Total       | 31          | 100.00%    |

**Table 4: Requirement of type of Measure for future environmental sustainability.**



5 respondent are in favour of traditional measurement, 8 respondents are in favour of innovative measurement whereas maximum 18 respondents are in favour of using both traditional and innovative measurement for sustainable environment growth. According to them it is possible to achieve with the help of both traditional and innovative methods.

## Conclusion:

In Nashik city, environment has been changing since few years. Many entrepreneurs are also aware about this and have taken some steps to achieve sustainable environment growth. These steps sometimes are resulting it into some extra cost burden but on the other side some steps are less costly. Overall it is require to implement steps for sustainable environment and also equally important to make it innovative with traditional touch in future.

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