

Seminar 11

Impact of climate change on air quality monitoring

Overview:

This seminar brings together environmental scientists, public health experts, policymakers, and technologists to explore the interconnectedness of climate change and air quality. The focus is on understanding how climate change exacerbates air pollution and how air quality monitoring systems can adapt to this evolving challenge. Participants will discuss the technological, scientific, and policy shifts needed to address the impact of climate change on air quality.

Climate change is altering atmospheric conditions, leading to more frequent and intense weather events, such as heatwaves and wildfires, that contribute to poor air quality. Rising temperatures also increase ground-level ozone formation, while stagnant air conditions exacerbate pollution buildup in urban areas.

Challenge: How can air quality monitoring systems adapt to provide accurate, actionable data in the face of these climate-driven changes?

Case study contexts for discussion:

- **Wildfire smoke and urban air quality:** Monitoring the spread of fine particulate matter (PM_{2.5}) during wildfire seasons that are prolonged by climate change.
- **Ozone and heatwaves:** Tracking the increase in ground-level ozone during prolonged heatwaves in metropolitan areas.
- **Extreme weather events:** Assessing the impact of storms, floods, or droughts on air quality and pollutant dispersion patterns.
- **Rural and developing regions:** Addressing gaps in air quality monitoring infrastructure in areas most vulnerable to climate change effects.

Key areas for discussion:

1. Technological and scientific perspectives

- How does climate change influence air quality trends, such as the frequency and intensity of ozone pollution or particulate matter events?
- What new technologies (e.g., satellite data, IoT sensors, AI models) can improve the resolution and accuracy of air quality monitoring in changing climatic conditions?

- How can climate models and air quality models be integrated for better forecasting?

2. Practical applications

- What strategies can be implemented to adapt existing air quality monitoring networks to climate-related challenges?
- How can real-time air quality data be used to inform public health advisories during climate-induced pollution events, such as wildfire smoke episodes?

3. Ethical and policy considerations:

- How can air quality data be used to support vulnerable communities disproportionately affected by climate change and air pollution?
- What policy changes are needed to integrate air quality management into broader climate change mitigation and adaptation strategies?

Seminar format:

- **Introduction (10 minutes)**
- **Small group discussions (30 minutes):** Divide into teams to tackle a hypothetical environmental crisis: A major city is experiencing a record-breaking heatwave combined with wildfire smoke drifting from nearby forests. PM2.5 levels and ozone concentrations are at hazardous levels, prompting health concerns and public outcry.
- **Case study analysis (30 minutes):**
 - Design a comprehensive air quality monitoring and response plan tailored to the immediate crisis and the longer-term impacts of climate change.
 - Propose ways to communicate real-time air quality data to the public effectively.
 - Recommend policies or actions to mitigate future events, considering the role of climate change in air quality trends.
- **Panel discussion (20 minutes):** Each group will present their action plan and discuss how it balances scientific accuracy, technological feasibility, and public health priorities.
- **Conclusion and Q&A (10 minutes).**

Expected outcomes:

1. A deeper understanding of how climate change affects air quality and the implications for monitoring systems.
2. Insights into technological innovations and policy interventions needed to address climate-driven air quality challenges.
3. Actionable strategies for integrating air quality data into climate adaptation and public health frameworks.