**Project:**

**Summarizing and Analysing Research Paper**

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| **Learner Name:** | **Ritika** |
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| **Topic:** | **Impact of Climate Change on Biodiversity** |
| **Research Paper:** | **https://www.researchgate.net/publication/341676257\_Impact\_of\_Climate\_Change\_on\_Biodiversity\_An\_Overview** |

**Initial Prompt:**

**Description:**

What is biodiversity and impacts of climate changes on it? Summarise the given content accordingly:Biodiversity is the 'Full variety of Life on Earth'. It includes diversity within species, between species and of ecosystem. Biodiversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.' In the simplest sense, biodiversity may be defined as the sum total of species richness, i.e. the number of species of plants, animals and microorganisms occurring in a given region, country, continent of the entire globe. Due to increase in temperature several plant species like Berberisa siatica, Taraxacum officinale, Jasminum officinale etc.have shifted towards higher altitude in Nainital. Teak dominated forests are predicted to replace the Sal trees in central India and also the conifers may be replaced by the deciduous types. Slight change in climatic condition leads to the extinction of animal species. Climate change also alters the disease behavior in animals. The devastating amphibian disease chytrid fungus, likely exacerbated by warmer temperatures, has left many amphibian populations dwindling or extinct. Variation in temperature and precipitation patterns can result in more frequent droughts and droughts and floods making indigenous plants more vulnerable to pests and diseases.

**Generated Summary:**

\*\*Biodiversity\*\* refers to the full variety of life on Earth, encompassing the diversity within species, between species, and across ecosystems. It includes the richness of species, such as plants, animals, and microorganisms, in various regions or globally.

\*\*Impact of Climate Change on Biodiversity\*\*:

- Climate change, particularly rising temperatures, has led to the migration of plant species to higher altitudes, as observed in Nainital with species like \*Berberis asiatica\* and \*Jasminum officinale\*.

- In India, teak forests are predicted to replace sal trees, and coniferous forests may be replaced by deciduous forests due to climate shifts.

- Even slight changes in climate can lead to the extinction of animal species and alter disease patterns, with warmer temperatures exacerbating issues like the chytrid fungus, devastating amphibian populations.

- Variations in temperature and precipitation can increase the frequency of droughts and floods, making indigenous plants more susceptible to pests and diseases.

**Iteration 1**

**Description:**

Add the following info with the given summary: IMPACT OF CLIMATE CHANGE ON ENVIRONMENT: The impact of the greenhouse gases is the warming near surface global temperature through the green house effect. The global warming affects plants, animals and microorganisms both by changing their habitats and by directly affecting their physiological processes. An other important phenomenon associated with temperature rise is coral bleaching. When corals become affected by the rising temperature and other climatic issues they lose their beautiful colours turning white. Climate change affects the water resources thought increased evaporation rate. Increased evaporation rates are expected to reduce water supplies in many regions. The greatest deficits are expected to occur in the summer leading to be decreased soil moisture levels and more frequent and severe agriculture drought. Only a small change in pattern of climate has severe impact on the biodiversity, altering the habitats of the species and presenting a threat for their survival, making them vulnerable to extinction

**Generated Summary:**

\*\*Biodiversity\*\* refers to the full variety of life on Earth, including the diversity within species, between species, and across ecosystems. It encompasses the richness of species—plants, animals, and microorganisms—in various regions or globally.

\*\*Impact of Climate Change on Biodiversity\*\*:

- Climate change, particularly rising temperatures, has caused plant species to migrate to higher altitudes, as seen in Nainital with species like \*Berberis asiatica\* and \*Jasminum officinale\*.

- In India, teak forests are predicted to replace sal trees, and coniferous forests may be replaced by deciduous ones due to climate shifts.

- Even slight changes in climate can lead to the extinction of animal species and alter disease patterns, with warmer temperatures worsening issues like the chytrid fungus, which has devastated amphibian populations.

- Variations in temperature and precipitation can increase the frequency of droughts and floods, making indigenous plants more susceptible to pests and diseases.

\*\*Impact of Climate Change on the Environment\*\*:

- The increase in greenhouse gases leads to a warming of global surface temperatures through the greenhouse effect. This warming affects plants, animals, and microorganisms by altering their habitats and directly impacting their physiological processes.

- One significant phenomenon linked to temperature rise is coral bleaching. When corals are affected by rising temperatures and other climate-related issues, they lose their vibrant colors and turn white.

- Climate change also impacts water resources by increasing evaporation rates, which are expected to reduce water supplies in many regions. The most significant deficits are expected during the summer, leading to decreased soil moisture levels and more frequent and severe agricultural droughts.

- Even a small change in climate patterns can severely impact biodiversity, altering species' habitats and threatening their survival, making them more vulnerable to extinction.

**Iteration 2**

**Description:**

Add the rest info and generate a proper summary :IMPACT OF CLIMATE CHANGE ON HUMANSClimate change leads toan increase in temperature, melting of the ice, increased natural events like floods, droughts, and cyclones displace the humans from their home.Hot climate makes insect pests in general and vectors and pathogens in particular to spread over a wider range and enhances their survival rate . Thus global climate changes have major implications on human health. It is obvious that effect on ecosystem will change the distribution and burden of vector borne infectious diseases i ncl udi ng ba cterial disease s. Ch ang es in epidemiology may already be underway, complex biological changes are associated with change in ecosystem. IMPACT OF CLIMATE CHANGE ON ECOSYSTEM: Climate change is leading to sea level rise, increased coastal erosion, flooding, higher storm surges, sea salinity ingress, increased sea-surface temperatures, ocean acidification and coral bleaching. Temperatures in the Himalayan ecosystem are increasing at a rate of 0.9°C annually, which is considerably higher than the global average of 0.7°C per decade. Climate change leads to variability in rainfall patterns, heat stress, spread of pests and diseases and shortening of the crop cycle and affecting plant growth and production.

**Generated Summary:**

\*\*Biodiversity\*\* refers to the full variety of life on Earth, encompassing the diversity within species, between species, and across ecosystems. It includes the richness of species—plants, animals, and microorganisms—across various regions or globally.

\*\*Impact of Climate Change on Biodiversity\*\*:

- Climate change, particularly rising temperatures, has caused plant species to migrate to higher altitudes, as seen in Nainital with species like \*Berberis asiatica\* and \*Jasminum officinale\*.

- In India, teak forests are predicted to replace sal trees, and coniferous forests may be replaced by deciduous ones due to climate shifts.

- Even slight changes in climate can lead to the extinction of animal species and alter disease patterns, such as the worsening of chytrid fungus, which has devastated amphibian populations.

- Variations in temperature and precipitation increase the frequency of droughts and floods, making indigenous plants more susceptible to pests and diseases.

\*\*Impact of Climate Change on the Environment\*\*:

- The increase in greenhouse gases results in the warming of global surface temperatures through the greenhouse effect. This warming affects plants, animals, and microorganisms by altering their habitats and impacting their physiological processes.

- Coral bleaching is a significant phenomenon linked to temperature rise. Corals lose their vibrant colors and turn white due to rising temperatures and other climate-related issues.

- Climate change impacts water resources by increasing evaporation rates, expected to reduce water supplies in many regions. The most significant deficits are expected during summer, leading to decreased soil moisture and more frequent, severe agricultural droughts.

\*\*Impact of Climate Change on Humans\*\*:

- Climate change leads to higher temperatures, ice melting, and increased natural events like floods, droughts, and cyclones, displacing people from their homes.

- Warmer climates enable insect pests, vectors, and pathogens to spread over a wider range and enhance their survival rates, significantly impacting human health.

- Changes in ecosystems due to climate change alter the distribution and burden of vector-borne infectious diseases, including bacterial diseases, with ongoing changes in epidemiology.

\*\*Impact of Climate Change on Ecosystems\*\*:

- Climate change leads to sea-level rise, increased coastal erosion, flooding, higher storm surges, sea salinity ingress, increased sea-surface temperatures, ocean acidification, and coral bleaching.

- In the Himalayan ecosystem, temperatures are rising at a rate of 0.9°C annually, higher than the global average of 0.7°C per decade.

- Climate change causes variability in rainfall patterns, heat stress, the spread of pests and diseases, and shortening of crop cycles, all of which affect plant growth and production.

**Final Iteration**

**Description:**

Summarize the last generated summary in the best way using proper headings. And also shorten the word length but with accuracy and effectiveness.

**Generated Summary:**

### Biodiversity and Climate Change

\*\*Biodiversity:\*\* The variety of life on Earth, including species and ecosystems, is increasingly at risk due to climate change.

### Impact on Biodiversity

- \*\*Plant Migration:\*\* Rising temperatures push species to higher altitudes, like in Nainital.

- \*\*Forest Shifts:\*\* Teak may replace sal trees in India, with conifers yielding to deciduous forests.

- \*\*Extinction Risks:\*\* Climate change increases extinction threats and worsens diseases like chytrid fungus in amphibians.

- \*\*Increased Vulnerability:\*\* More droughts and floods make native plants more prone to pests and diseases.

### Impact on the Environment

- \*\*Global Warming:\*\* Greenhouse gases raise temperatures, disrupting habitats and species' functions.

- \*\*Coral Bleaching:\*\* Higher sea temperatures cause corals to bleach, losing their color.

- \*\*Water Scarcity:\*\* Increased evaporation reduces water supplies, leading to droughts and lower soil moisture.

### Impact on Humans

- \*\*Displacement:\*\* Events like floods and cyclones displace people and disrupt lives.

- \*\*Health Risks:\*\* Warmer climates expand the range of pests, spreading diseases.

### Impact on Ecosystems

- \*\*Coastal and Marine Changes:\*\* Sea-level rise and ocean acidification threaten marine life.

- \*\*Himalayan Warming:\*\* The Himalayan region warms faster than the global average, affecting local ecosystems.

- \*\*Agricultural Stress:\*\* Climate variability impacts rainfall and pests, reducing crop yields.

**Insights and Applications**

**Key Insights:**

Climate change poses significant threats to biodiversity, causing species to migrate to higher altitudes and altering forest compositions. It increases extinction risks and exacerbates diseases like chytrid fungus in amphibians. Frequent droughts and floods heighten vulnerability for native plants, making them more susceptible to pests and diseases.

The environment faces severe impacts, including habitat disruption from global warming, coral bleaching due to rising sea temperatures, and reduced water supplies from increased evaporation.

Humans are affected through displacement caused by natural disasters like floods and cyclones and increased health risks as warmer climates expand the range of disease-carrying pests.

Ecosystems are disrupted by sea-level rise, coastal erosion, and ocean acidification, while the Himalayan region warms faster than average, affecting local ecosystems and agricultural productivity.

**Potential Applications:**

Understanding the impacts of climate change on biodiversity, the environment, and human health opens opportunities for targeted interventions and solutions:

1. \*\*Conservation Strategies:\*\* Implementing habitat protection and restoration projects can help mitigate species migration and extinction risks, while adaptive management can support forest resilience and biodiversity conservation.

2. \*\*Climate-Resilient Infrastructure:\*\* Designing infrastructure to withstand extreme weather events and sea-level rise can reduce human displacement and environmental damage.

3. \*\*Coral and Marine Conservation:\*\* Protecting marine ecosystems through policies and conservation programs can help combat coral bleaching and ocean acidification, preserving marine biodiversity.

4. \*\*Water Resource Management:\*\* Developing water-saving technologies and strategies to manage reduced water supplies and prevent drought impacts on agriculture can enhance water security.

5. \*\*Health Interventions:\*\* Monitoring and controlling the spread of disease vectors and enhancing public health systems can address climate-driven health risks and prevent the spread of infectious diseases.

**Evaluation**

**Clarity:**

The summary and insights are clear and concise, effectively conveying the major impacts of climate change on biodiversity, the environment, human health, and ecosystems. They highlight key issues like species migration, habitat disruption, and health risks, and suggest practical applications such as conservation strategies and water management. Overall, the content is accurate and actionable.

**Accuracy:**

The summary and insights accurately reflect the provided information. They correctly highlight the key impacts of climate change on biodiversity, the environment, and human health. The insights effectively translate these impacts into potential applications, such as conservation strategies, climate-resilient infrastructure, marine protection, water management, and health interventions. Both the summary and insights align well with the detailed impacts described in the original content.

**Relevance:**

The potential applications align well with the provided insights. Conservation strategies and climate-resilient infrastructure directly address biodiversity loss, habitat disruption, and human displacement. Marine conservation and water resource management tackle environmental impacts like coral bleaching and water scarcity. Health interventions are crucial for managing disease risks linked to climate change. These applications are relevant as they offer practical solutions to mitigate the adverse effects described in the insights.

**Reflection**

**Learning Experience:**

The "Introduction to Gen AI" course provided an exceptionally valuable learning experience. The course was meticulously designed, with modules and quizzes structured to facilitate a thorough understanding of Generative AI from the basics. Its clear and accessible presentation made it possible for individuals from various backgrounds to grasp core concepts effectively. The course content was engaging and informative, which significantly enhanced the learning process.

My journey with "Skillible" has ignited a strong desire to explore Generative AI further. The quizzes were particularly beneficial, as they offered insightful assessments of our comprehension of the material. Before this course, I was unfamiliar with Prompt Engineering within the AI field, but I now have a solid understanding of its concepts, techniques, and styles. Additionally, the course introduced me to various AI tools and applications that were previously unknown to me.

The skills I have acquired, particularly in using prompting techniques, have greatly improved my ability to obtain accurate and refined answers for diverse tasks. Overall, the course has not only expanded my knowledge but also equipped me with practical skills to apply in the field of Generative AI.

**Challenges Faced:**

While the "Introduction to Gen AI" course was well-structured and insightful, applying the concepts has been challenging. I often struggle with how to frame questions effectively and where to start. Iterating through prompts sometimes fails to produce the desired results, and some information can be omitted or inaccurately reflected in the output. Although the course introduced me to various AI tools and prompting techniques, creating precise and clear prompts still requires more practice to refine my skills and achieve accurate, reliable results.

**Insights Gained:**

The "Introduction to Gen AI" course provided a thorough foundation in Generative AI, including essential concepts such as Prompt Engineering and exposure to various AI tools. The structured and engaging content made complex topics accessible, enhancing overall comprehension and sparking a deeper interest in the field. However, applying these newly acquired skills presented challenges. Framing questions effectively and determining appropriate starting points for prompts proved difficult. Iterative attempts often failed to produce the desired results, with information sometimes omitted or inaccurately reflected in the generated answers. This practical application highlighted the gap between theoretical understanding and real-world execution. Despite the course's strong theoretical foundation, achieving precision in prompt creation remains a challenge. It became clear that while the course provided valuable insights and skills, mastering the art of precise and effective prompting requires additional practice. Continuous refinement of these techniques is necessary to improve the accuracy and reliability of AI-generated responses. This experience underscored the importance of hands-on practice and iterative learning to bridge the gap between learning and effective application in Generative AI.