ESC205A: Assignment-1 (Role of IT in Environment)

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With newer technologies, conservationists can address our environmental challenges more effectively. Technologies like Cameras, drones, sensors, eDNA, satellites, and AI models are crucial in studying species and ecosystems across the earth.

Although some of these technologies still lack overall performance, they have substantial room for further development, and thus, they have scope for exploration and improvement.

They are:

1) Using drones and camera Traps to monitor fauna

The remote sensing techniques and camera traps help obtain data on endangered species and their ecosystem; this also involves using GPS technology and software that measures, evaluates, and helps improve the overall effectiveness of wildlife law enforcement and conservation activities. They are not only used in the terrestrial ecosystem but also the marine ecosystem. With technological advancements, unmanned aerial vehicles (drones) offer a safer and more flexible solution to some technically

challenging conservation problems. By Using Drones, Conservation Response Units minimize human-wildlife conflicts/contacts.

Also, they can provide an airborne early-warning system when wild animals are approaching Human settlement. With the help of drones and 3D software, conservationists can map lesser-known forests.

2) Increasing usage of Renewable Energy Sources

Renewable Energy Sources are the most essential tool of today's environmental preservation era. They are responsible for changing energy generation techniques, lowering our reliance on non-renewable energy sources, and reducing greenhouse gas emissions. Modern photovoltaic and semiconductor technologies have increased the effectiveness of solar energy, while new engineered designs of wind turbines have increased energy production. Newly built smart grids can optimize energy delivery with waste reduction and higher efficiency. Many of these advancements are due to Newer simulation models and improving our current electronic physics modeling (IT here plays a pretty important role).

3) Intelligent Management and Monitoring

Scientists may manage and monitor our natural resources using satellite imaging and remote sensing technology combined with IoT. It is also helpful in identifying endangered ecosystems and early pollution indications.

4) Data Analytics and Big Data

Every day, lots of data is produced and analyzed. Big data analytics helps us understand climatic trends, animal behavior, and ecological dynamics. Machine learning algorithms in these analyses might also help optimize resource allocation for conservation efforts.

5) Sustainable Farming and Precision Farming

Drones, sensors, and GPS technology are used in precision farming practices to minimize soil erosion, apply fewer fertilizers and pesticides, and maximize water use. Thus, technology now provides methods for managing land more effectively and sustainably producing food.

6) Artificial intelligence (AI) { mainly involving machine learning and computer vision }

Artificial intelligence (AI) analyzes information that wildlife conservationists collect. It can help identify rare species or specify a specific animal from field recordings and photos, saving the manual labor in obtaining vital data.

7) Genomics (and Environmental DNA)

Environmental DNA (eDNA) is a means to collect biodiversity data easily and quickly, simply by scanning water or soil samples. A few samples may contain the DNA of various species and thus can prove helpful in generating essential details of an ecosystem. They can reveal any presence of new species in an area.

8) Networked sensors

They are a network of tracking devices, sensors, camera traps, and recorders connected online, forming a detailed description of fauna movements and behavior. They help environmentalists and local communities track, monitor, and get alerts about threats in an ecosystem.

9) Engaging people through IT

Information Technology also helps raise awareness about environment conservation among the wider public. Many Games on the same thought

were created, such as Silverback and Runescape. People are also donating to environment conservation through online portals to lend as much help as possible in saving our environment. Even world organizations like UNEP contribute to that charge through its Digital Transformation program.

References

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