Best Practice 2

1. Title of the Practice: Urban Biodiversity Conservation Initiative

2. Objectives of the Practice What are the objectives/intended outcomes of this "best practice" and what are the underlying principles or concepts of this practice? (in about 100 words)

The primary Objectives of this initiative is to:

- Scientifically document the diversity of flora and fauna species in V.P.M campus.
- Educate students and the community about the ecological importance of various species (such as butterfly as bioindicators of ecosystem health).
- Promote citizen science as a tool for biodiversity conservation by leveraging platform through iNaturalist.
- Foster research skills and environmental stewardship among students by integrating academic learning with field-based ecological studies.
- Contribute to global biodiversity databases, aiding conservation efforts at local and global levels.

3. The Context What were the contextual features or challenging issues that needed to be addressed in designing and implementing this practice? (in about 150 words)

Thane, part of the biodiverse Konkan region, is witnessing rapid urbanization, leading to habitat fragmentation and biodiversity loss. For example Butterflies, as pollinators hold immense importance in urban ecosystems. However, baseline data on butterfly species in Thane was limited, making conservation planning challenging.

Recognizing these issues, institute launched this initiative during Big Butterfly Month. It was decided to systematically document butterfly species, create awareness, and train participants in biodiversity research. Further this project was expanded to document other species such as odonates, reptiles, arachnids, birds, fungi and plant.

4. The Practice. Describe the practice and its uniqueness in the context of Indian higher education. What were the constraints/limitations, if any, faced? (in about 400 words)

Components of the Practice:

1. Guest Lecture and Training:

   Participants were trained in butterfly identification, the ecological role of butterflies, and using the iNaturalist platform for data documentation. The activities includes guest lectures on “A demonstration of iNaturalist” and “In the world of butterflies” as part of the big butterfly month. These activities empowered students to identify butterflies during field surveys and document their observations accurately. Students were also introduced to ethical wildlife photography by attending an expert talk “Hidden potential of photography in Wildlife”.

2. Field Surveys:

   The core of the project involved field surveys in college campus along with parks and gardens. Surveys were conducted over a span of several months, with participants recording butterfly sightings and uploading their observations on iNaturalist. Notable butterfly species documented included the Common Jezebel (*Delias eucharis*), Anomalous Nawab (*Charaxes agrarius*) , and Blue Mormon (*Papilio polymnestor*) among others.

3. Data Documentation and Analysis:

The documented species were analyzed and validated by experts and identification keys to ensure the accuracy of the data. This also involved cross-referencing the iNaturalist platform‟s global database to contribute to the wider biodiversity research efforts. Data was also used for academic research. This work ensured the continuity of the project among students and other citizens for documentation.

Uniqueness in the Context of Indian Higher Education:

This practice stands out in the context of Indian higher education for its interdisciplinary approach that combines ecology, technology, and community engagement. It is one of the model of how educational institutions can contribute to environmental research through hands-on learning and by integrating technology into real-world conservation efforts. It also exemplifies the use of citizen science in urban biodiversity conservation, offering students the opportunity to actively participate in ecological research.

Constraints and Limitations:

The project encountered several challenges that required strategic planning and adaptability. Seasonal limitations were a significant factor, as butterfly species are active during specific times of the year, restricting the time frame available for documenting certain species. Surveys had to be meticulously planned to align with peak activity periods, ensuring maximum sightings and comprehensive data collection. Resource constraints such as limited access to essential field equipment like high-quality cameras and reliable identification guides made project challenging. Furthermore, some participants lacked prior experience in fieldwork thus requiring additional training sessions to build their skills and confidence. These challenges underscored the importance of flexibility and resourcefulness in achieving the project‟s objectives.

5. Evidence of Success Provide evidence of success such as performance against targets and benchmarks, review/results. What do these results indicate? Describe in about 200 words.

The Butterfly Documentation Initiative achieved remarkable success as demonstrated by key outcomes. The project documented over 69 butterfly species reported from VPM Campus. This effort enriched the local biodiversity database and contributed valuable data to the global iNaturalist platform, highlighting the diverse butterfly population in urban ecosystems. Participant engagement was exceptional, with over 22 students, alumni, faculty members, and community members involved. This widespread participation reflected a strong community interest in biodiversity and conservation.

Many participants expressed a newfound interest in pursuing careers in environmental science and biodiversity wildlife conservation and management, showcasing the initiative‟s role in shaping future conservationists. Additionally, the validated data shared on iNaturalist was integrated into a global biodiversity repository, supporting international research and conservation efforts. This data was further presented and published in National Conference titled “Biodiversity and Sustainable Development” on 25th March 2023. This initiative played a pivotal role for college to apply for and to become strong contender for the prestigious “Majhi Vasundhara Competition,” organized by the Thane Municipal Corporation.

6. Problems Encountered and Resources Required Please identify the problems encountered and resources required to implement the practice (in about 150 words).

Problems Encountered:

The project faced several challenges that required creative problem-solving and resourcefulness. Butterfly activity is highly seasonal, meaning that the timing of surveys was crucial to capture the maximum diversity of species. This seasonal constraint limited the duration of data collection, further complicating the project timeline. Another significant challenge was the difficulty in accurately identifying some butterfly species, as certain species closely resembled others. Lastly, limited resources posed a challenge, particularly when it came to acquiring high-quality field equipment such as cameras, binoculars, and butterfly identification guides.

Resources Required:

The project faced several logistical hurdles that required careful planning and resource management. Field equipment, such as cameras, binoculars, and identification manuals, were essential for documenting butterfly species accurately and in detail. Without access to high-quality tools, capturing clear images and observing butterflies in the field was a challenge. Additionally, the success of the project heavily relied on training and expert support. Mentors with expertise in entomology were crucial for validating species, ensuring the accuracy of the observations, and providing the necessary training to participants. Another key factor was technology access. Reliable internet connectivity and devices for using the iNaturalist platform were crucial for documenting and sharing data. Participants needed the right tools to upload observations and interact with the platform effectively, which required a stable and accessible technological infrastructure. These challenges highlighted the importance of both physical resources and technical expertise to ensure the success of the project.

7. Notes (Optional) Please add any other information that may be relevant for adopting/implementing the Best Practice in other Institutions (in about 150 words).

This documentation initiative can be easily adopted by other institutions by emphasizing the integration of field-based learning with technology. Institutions can collaborate with local environmental organizations to provide expertise, mentorship, and resources for biodiversity studies. Training students to use citizen science platforms like iNaturalist not only enhances their ecological awareness but also allows them to contribute meaningfully to biodiversity conservation efforts. It is also essential to focus on creating awareness in urban areas about the importance of preserving green spaces, even in cities. Encouraging local communities to participate in biodiversity projects fosters a sense of environmental responsibility and conservation. Institutions can also address challenges related to seasonal constraints and habitat accessibility by scheduling surveys at strategic times and focusing on urban parks and gardens. This practice promotes interdisciplinary learning, where students gain knowledge not only in biology but also in technology, community engagement, and environmental stewardship.

Any other information regarding Institutional Values and Best Practices which the university would like to include.

Institutional Values and Best Practices

V.P.M's B.N. Bandodkar College of Science is deeply committed to fostering academic excellence, environmental stewardship, and community engagement through innovative practices. The institution values sustainability, inclusivity, and the holistic development of students, aiming to create well-rounded individuals who contribute meaningfully to society. The Butterfly Documentation Initiative is one of several initiatives that align with the college's core values of:

1. Environmental Responsibility:
   The project emphasizes the importance of preserving biodiversity and creating ecological awareness, particularly in urban settings, aligning with college‟s program outcomes and commitment to environmental sustainability.
2. Research and Innovation:
   The integration of citizen science into academic learning fosters critical thinking, research skills, and practical knowledge. This initiative promotes interdisciplinary collaboration between students, faculty, and the community, encouraging innovation in conservation practices.
3. Community Engagement and Service:
   The project encourages students to engage with the local community, raising

awareness about urban biodiversity and the role of citizen science in conservation. By involving the broader community, the college ensures that its educational impact extends beyond the classroom.

4. Technological Integration: The college encourages the use of cutting-edge technology, such as iNaturalist, to bridge the gap between academics and real-world ecological challenges. By utilizing digital platforms, students and the community contribute to global biodiversity data, reflecting the college‟s emphasis on the application of technology for societal benefit.

Through these practices, the college demonstrates its dedication to sustainable development, global awareness, and the empowerment of students to make a tangible difference in the world.