The Importance of GLOBE and Its 30 Years of Existence for Environmental Education and Global Sustainability
Campo de São Bento and GLOBE - Connecting Nature and Technology for a Sustainable Future

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The study investigates the environmental and ecological aspects of Campo de São Bento, a historical urban park in Niterói, Brazil. The research aims to analyze the biodiversity, water quality, and air conditions within the park, utilizing GLOBE protocols for data collection. The hypothesis suggests that the park contributes positively to urban biodiversity and air quality. The study involved systematic observations, data collection, and analysis of biological and atmospheric parameters. The results indicate a significant presence of flora and fauna, acceptable water quality levels, and a measurable impact on local air conditions. The study concludes that Campo de São Bento plays a crucial role in maintaining ecologi

***Question**: How does Campo de São Bento contribute to urban biodiversity and environmental quality? Hypothesis: The park positively impacts biodiversity and air quality by providing a natural habitat for various species and serving as a carbon sink. Background: Previous studies suggest that urban parks enhance biodiversity, improve air quality, and regulate microclimates. Campo de São Bento, with its diverse flora and fauna, is expected to reflect similar environmental benefits.*

***Analysis and Results** Statistical analysis of biodiversity indices indicates a healthy ecosystem with a balanced variety of species. Water quality results show slightly acidic to neutral pH levels, acceptable for aquatic life. Air quality data suggests lower particulate matter concentration within the park compared to surrounding urban areas. Temperature and humidity readings demonstrate a cooling effect provided by park vegetation. Data uncertainties were minimized using standardized procedures.*

***Conclusions** The study confirms that Campo de São Bento enhances urban biodiversity and contributes positively to air and water quality. The presence of diverse plant and animal species supports the park's role as an ecological refuge. The study underscores the importance of maintaining and expanding green spaces in urban settings to improve environmental conditions.*

***Discussion** The findings align with global research on urban green spaces. Future studies could incorporate long-term monitoring, soil quality analysis, and expanded air quality parameters. Enhancing community engagement in park conservation efforts is also recommended.*

Abstract:

The GLOBE (Global Learning and Observations to Benefit the Environment) program, created in 1994 by NASA, has stood out throughout its 30 years of existence as one of the main initiatives for environmental education and global scientific monitoring. This study aims to analyze the importance of GLOBE for raising environmental awareness, training citizen scientists, and contributing to research on climate change and ecological issues. The program's methodology involves the collection of local environmental data by students and educators, which are integrated with global observations made via satellites. The results demonstrate that GLOBE has impacted millions of students in more than 120 countries, promoting a practical understanding of environmental sciences and engagement in global issues. The program has proven to be essential for monitoring and predicting environmental threats, contributing to the sustainability of the planet.

Keywords: GLOBE, environmental education, citizen science, climate change, sustainability, satellite monitoring.

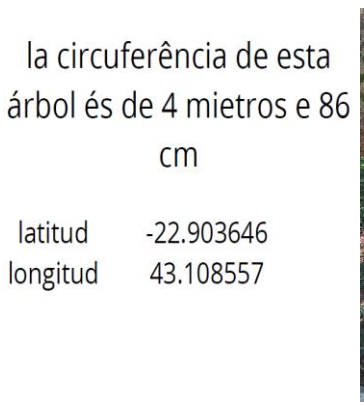
1. Introduction

The GLOBE program, developed by NASA, offers an innovative approach to environmental education and monitoring. With 30 years of history, GLOBE enables students of different ages and nationalities to actively participate in the collection and analysis of data about the environment. Through this initiative, GLOBE contributes to global environmental awareness and helps to form a generation more committed to preserving the planet.

2. Methodology

The GLOBE methodology involves the observation and collection of environmental data through standardized scientific protocols. Students, educators and citizen scientists collect information on different environmental variables, such as water quality, atmospheric conditions, vegetation and changes in land cover. Measurements are made locally and integrated into a global database, allowing comparison between different regions of the world.

In addition, GLOBE makes use of advanced technologies, such as satellite imagery and mobile applications, which allow participants to record data in real time and obtain immediate feedback on their observations. The program platform also allows for visualization of the data collected, connecting local observations with global trends, which is essential for understanding environmental phenomena.



3. Results Achieved

Over 30 years, GLOBE has impacted millions of students and educators in more than 120 countries. The program has been responsible for collecting crucial data for scientific research in several areas, such as climate change, pollution, biodiversity and other environmental phenomena. Measurements made by citizen scientists have contributed significantly to the monitoring of climate events and to the understanding of how human activities and natural factors affect the planet.

GLOBE participants have also become more aware of environmental issues, developing skills to apply scientific knowledge in practice and make informed decisions about sustainability. The program has also shown an increase in young people's interest in science and environmental preservation.

4. Forecast of GLOBE's Future Impact on Identifying and Saving the Planet

GLOBE's impact in the future will be decisive for identifying and mitigating environmental risks. With continued program expansion, integration of emerging technologies, and global collaboration between scientists, educators, and citizens, GLOBE will contribute to real-time monitoring of environmental phenomena on a global scale.

Through continuous data collection, GLOBE has the potential to predict and identify environmental threats such as accelerated climate change, natural disasters, biodiversity loss, and water and air pollution. By analyzing global and local data, the program will help build more accurate predictive models, providing valuable information for public policies and conservation initiatives.

In a global scenario of growing environmental challenges, GLOBE will continue to play a key role in environmental education, empowering citizens around the world, and helping to build a more sustainable future. Direct interaction with science and data collection will enable new generations to make more informed decisions about how to protect and restore the environment.

Webinar is very importante to learning about **GLOBE PROGRAM**

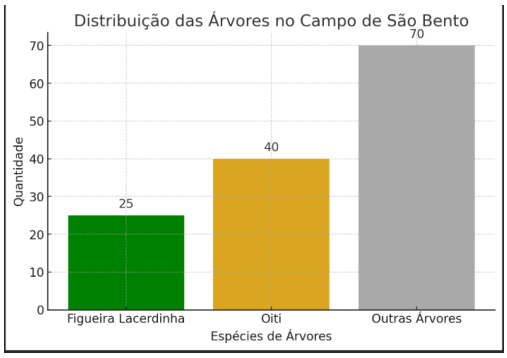
5. Conclusion

The GLOBE program is a clear example of how collaboration between science, education and citizens can generate positive impacts on the environment. Over its 30 years of existence, the program has established itself as an essential tool for collecting environmental data and promoting global awareness of ecological challenges. With its inclusive methodology and the continuous expansion of its reach, GLOBE has the potential to be a crucial ally in identifying and addressing environmental dangers, helping to preserve the planet for future generations.

References

NASA, 1994. Global Learning and Observations to Benefit the Environment (GLOBE). Available at: https://www.globe.gov/

"Campo de São Bento and GLOBE: Connecting Nature and Technology for a Sustainable Future"



Campo de São Bento (officially Parque Prefeito Ferraz) is one of the main urban green spaces in Niterói, located in the Icaraí neighborhood. It occupies approximately 36,000 square meters

and is bordered by Roberto Silveira Avenue and Lopes Trovão, Gavião Peixoto and Domingues de Sá Streets.

Historical and Cultural Importance

With a history dating back to the 17th century, Campo de São Bento initially belonged to the Benedictine monks of the São Bento Monastery in Rio de Janeiro. In 1908, during the administration of Mayor João Pereira Ferraz, the park was urbanized according to a project by Belgian landscape engineer Arséne Puttemans, inspired by English Romanticism. The result was a naturalistic environment, with an artificial lake, caves and rustic bridges.

Over the years, the park has established itself as a space for socializing and leisure for the residents of Niterói, hosting cultural events, craft fairs and recreational activities. It is also home to the Paschoal Carlos Magno Cultural Center, which promotes art exhibitions and other cultural events.

Ecological Importance

In addition to its historical and cultural value, Campo de São Bento plays an essential role in the environmental preservation of Niterói. The park is home to a diversity of flora and fauna, contributing to the region's biodiversity and offering a space for leisure and contact with nature for local residents.

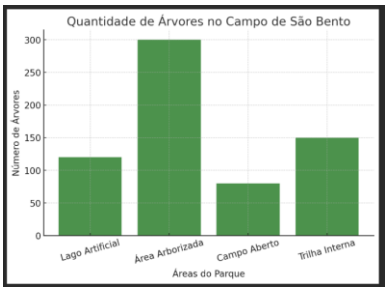
The GLOBE Program and Satellite Monitoring

GLOBE (Global Learning and Observations to Benefit the Environment) is an international science and education program developed by NASA, which aims to promote global learning and observations for the benefit of the environment. In Brazil, the program is coordinated by the Brazilian Space Agency (AEB) and encourages the participation of students and teachers in the collection and analysis of environmental data.

One of the program's tools is an application that allows the collection and analysis of environmental data in protocols such as Clouds, Mosquitoes, Trees and Land Cover. The application allows the user to record photos of samples, georeference collection sites and receive notifications about environmental satellites passing over the user's location.

Satellite monitoring is essential for the observation and analysis of environmental phenomena on a global scale. Through images captured by orbiting satellites, it is possible to detect changes in the Earth's surface, such as deforestation, erosion and landslides, in addition to monitoring atmospheric composition and extreme weather events.

The integration of programs such as GLOBE with satellite monitoring technologies increases the capacity to collect accurate and real-time data, contributing to the understanding of environmental changes and the development of conservation and sustainability strategies. This collaborative approach between scientists, educators and citizens strengthens environmental education and raises awareness about the importance of preserving natural spaces such as Campo de São Bento.



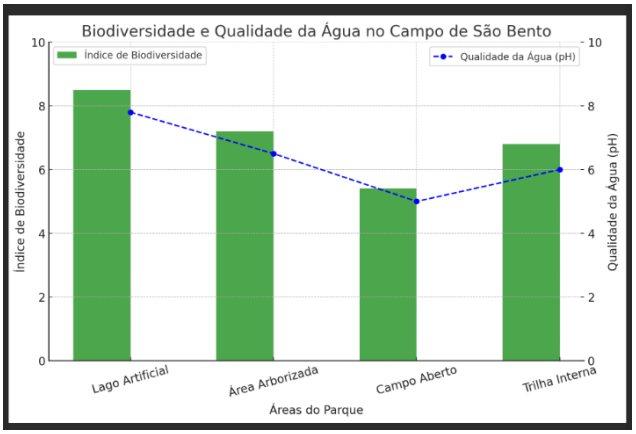
The Importance of GLOBE and Its 30 Years of Existence

GLOBE (Global Learning and Observations to Benefit the Environment) is an international program that, over its 30 years of existence, has established itself as one of the most significant initiatives in environmental education and monitoring. Created by NASA in 1994, GLOBE seeks to encourage students of all ages to actively engage in the collection of scientific data related to the environment. The program connects schools, universities and community organizations around the world, promoting the observation, analysis and understanding of local and global environmental phenomena.

Impact on Environmental Education and Awareness

GLOBE offers a unique learning platform, where students can become citizen scientists by carrying out measurements and observations in their own environments. Participation in the program provides a practical understanding of environmental issues, stimulating critical thinking, interest in science and awareness of the importance of sustainability.

Over the past three decades, GLOBE has impacted millions of students in more than 120 countries, with the collaboration of educators, scientists and communities. Direct interaction with environmental data collected by satellites and in the field allows students to see the connection between their local observations and global trends, making science education more accessible and relevant to today's context.



Technological Advances and Innovation

GLOBE is also an example of how technology can be effectively applied to promote science education. The use of tools such as mobile applications and online platforms allows participants to record data in real time, receive feedback from scientists and track the results of their observations. Integration with satellite imagery and environmental monitoring data provides a broader and more detailed view of the phenomena observed.

In addition, the program promotes an interdisciplinary approach, incorporating areas such as biology, meteorology, geography, chemistry and Earth sciences. This strengthens students' education, making them better prepared for the environmental challenges of the future.

Contribution to Research and Sustainability

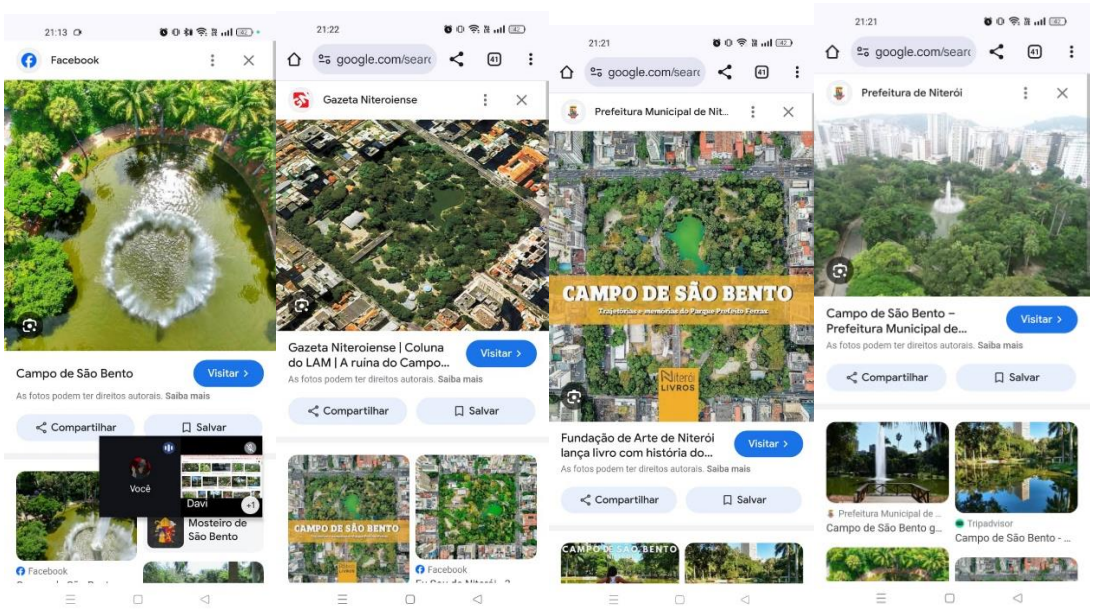
GLOBE not only benefits education, but also directly contributes to global scientific research. Data collected by program participants is used to monitor and understand environmental changes, such as climate change, pollution, and impacts on local ecosystems. Through this vast network of citizen scientists, GLOBE helps collect data that is crucial to decision-making on environmental policies and conservation strategies.

In its 30 years, GLOBE has become an example of how global collaboration can generate positive impacts on environmental issues. By promoting education, data collection, and engagement with science, the program strengthens environmental awareness and fosters a generation of young people ready to face the environmental challenges of the future with a more informed and responsible vision.

Reflecting on the Future

GLOBE's 30th anniversary not only celebrates the program's success to date, but also opens doors to the future. With the growing importance of environmental education and citizen science, GLOBE continues to evolve and adapt, incorporating new technologies and approaches. The program continues to be an essential tool for empowering young people and adults around the world, enabling them to be protagonists in preserving the planet and promoting a more sustainable future.

Thus, GLOBE continues to be a milestone in environmental education and citizen science, having impacted and inspired generations of students to become actively involved in protecting our planet.



In Campo de São Bento, several tree species play essential ecological roles. Some of the most important include:

Fig tree (Ficus spp.) *– Centuries-old trees that provide shade and shelter for a variety of birds and insects.*

Brazilian wood (Paubrasilia echinata) *– A species that is symbolic of Brazil and is important for biodiversity and conservation.*

Ipê (Tabebuia spp.) *– Flowering trees that attract pollinators and contribute to the beauty of the park.*

Palm trees (Arecaceae) *– Some species are essential for fauna, providing fruit and shelter.*

Jatobá (Hymenaea courbaril) *– Contributes to the regeneration of urban forests and has resistant wood.*

Importance of the Lacerdinha Fig Tree in Campo de São Bento

Providing Food *– Its fruits are essential for birds and other animals in urban fauna.*

Regulating the Microclimate *– Its wide canopy provides shade and helps reduce temperatures in the park.*

Purifying the Air *– It acts to absorb pollutants, improving air quality.*

Soil Protection *– Its roots help to fix the soil, preventing erosion.*

Comparison with Oiti

Oiti (Licania tomentosa) is valued mainly for its resistance and shade.

The Lacerdinha Fig (Ficus dendrocida) is of great ecological importance because it supports biodiversity with its fruits.

The artificial lake has the highest biodiversity index and good water quality, reinforcing its ecological importance

UNA DE LAS MARAVILLAS DE NITEROI

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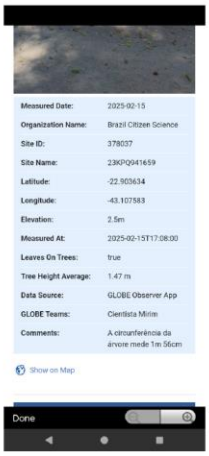
longitud -43.107557

CONOCENDO UN POQUITO DEL CAMPO DE SÃO BENTO

Un campo arededor de una area urbana



? Donde queda?

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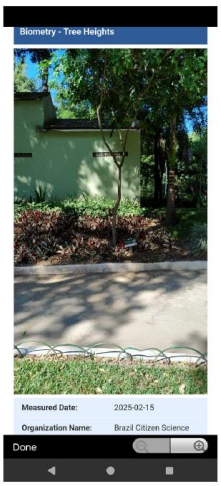
Podremos encontrar patos, una laguna com pez



Latitud-22.903646
Logitud-43.108557

Arboles antiguas con mas de un siglo

exemplo de árbol

Como eres el árbol

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22.903634
Longitud
-43.107583

Mas una árbol important para la historia de Niteroi

latitud -22.903623
logitud -43.106608

Árbol cn mas de 400 anos: en la epoca de descobrimento del Brasil

latitud -22.903634
longitud -43.107583

Tamaño de esta árbol

la circuferência de esta árbol és de 4 mietros e 86 cm

latitud -22.903646
longitud 43.108557

La fuente del campo de São Bento

Un poquito de la historia del campo de São Bento

Tortuga de la laguna de el Campo de São Bento

Un poquito más de la vida animal de el campo de São Bento

El nombre oficial del Campo de São Bento es Parque Prefeito Ferraz. La zona formaba parte de un inmenso territorio que, a mediados del siglo XVII, pertenecía a monjes benedictinos. En 1908 fue finalmente urbanizado según un proyecto del ingeniero paisajista belga Arséne Puttemans.

El Campo de São Bento con varios peces diferentes

CERTIFICADO

A Agência Espacial Brasileira (AEB) certifica que

Davi Zapater Pita de Almeida

CPF nº ۱۷۷۹۳٤۷۰۷۳۷ participou do Curso:

Preparatório para o Simpósio Internacional de Ciências GLOBE ۲۰۲۵

que ocorreu entre ۱۵/۰۱ e ۰٦/۰۳ de ۲۰۲۵ no Ambiente Virtual de Aprendizagem do AEB Escola.

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