THE WINDS OF CHANGE IN RUY BARBOSA

Investigating the Rio do Vento Wind Farm using NASA's GLOBE Protocols

LOCATION: Ruy Barbosa, Rio Grande do Norte
THE GOAL: Analyze **socio-environmental** and **technological impacts**
THE TOOL: GLOBE Observer App & Protocols

TEAM: LUAR Potengi
SCHOOL: EETI Rui Barbosa

THE SUBJECT: RIO DO VENTO COMPLEX

240
WIND TURBINES INSTALLED

14,000
HECTARES ACROSS 4 MUNICIPALITIES

1038 MW
INSTALLED CAPACITY

2 MILLION
HOMES POWERED

240
WIND TURBINES INSTALLED

14,000
HECTARES ACROSS 4 MUNICIPALITIES

CONTEXT: Operated by Casa dos Ventos. Energy sold to major companies including Anglo American and TIVIT.

THE INVISIBLE COST OF CLEAN ENERGY

GLOBAL BENEFIT

Reduces pollutants & reservoirs.

LOCAL IMPACT

Noise, Visuals, Signal Loss, Cracks.

THE CORE QUESTION

How does this giant machinery affect the ecosystem of Ruy Barbosa?

LOCAL REALITIES

- Noise pollution from rotors
- Visual landscape changes
- Electromagnetic interference
- Structural damage to homes

THE TOOLKIT: EARTH AS A SYSTEM

METHODOLOGY

Combining scientific measurement with community interviews to understand the whole system.

ATMOSPHERE (AIR)

Protocol: Cloud Classification

HYDROSPHERE (WATER)

Protocol: Mosquito Habitat Mapper

BIOSPHERE (LIFE)

Protocol: Biometrics & Land Cover

PEDOSPHERE (SOIL)

Protocol: Soil Temperature

THE WITNESSES: VOICES FROM RUY BARBOSA

Validating the hypothesis through local memory and observation.

AGES

19 to 63 years old

LOCATIONS

Urban and Rural Zones

OCCUPATIONS

Subsistence Farmers
Civil Servants
Technicians
Teachers

RESEARCH METHOD:

Structured interviews with 8 residents and 1 city councilman.

EVIDENCE A: THE GROUND BENEATH US

PEDOSPHERE / STRUCTURAL IMPACT

- **COMPACTION:**
  Heavy machinery made the soil drier and harder.
- **IMPERMEABILITY:**
  Rainwater runs off instead of seeping in.
- **STRUCTURAL DAMAGE:**
  Explosives used for rock detonation caused cracks in nearby walls.

> “The movement of the trucks moved the ground.”

EVIDENCE B: NATURE'S RETREAT

BIOSPHERE / FAUNA SHIFT

MISSING: Native birds like Turtledoves and 'Blue' birds have vanished.

INCREASING: Rattlesnakes (Cascavel) and nocturnal insects.

PRIMARY CAUSE:
Deforestation and habitat fragmentation.

OFFICIAL RESPONSE:
Relocation of animals into preservation areas increased local density.

EVIDENCE C: SENSORY & SIGNAL OVERLOAD

TECH & ATMOSPHERE

NOISE POLLUTION

SIGNAL INTERFERENCE

- **NOISE POLLUTION:**
  Constant buzz of rotors and flashing lights disturb sleep.
- **SIGNAL INTERFERENCE:**
  TV and Cell signals fail, specifically in rural areas.
- **CLIMATE PERCEPTION:**
  Residents report stronger winds and a "drier" sensation.

> "The peace we had ended a little."

THE ECONOMIC REALITY

SHORT TERM PROS

	Temporary jobs during construction phase.
	Increase in local commerce.
	Tax revenue (ICMS) for the municipality.

LONG TERM CONS

	Jobs vanished after construction ended.
	Little direct benefit for small farmers.
	Community "conformism" regarding environmental damage.

THE POLITICAL PERSPECTIVE

> The population has taken over conformism... The ideal would be a reforestation plan. We have to look at the recent past, study the present, and plan for the future.

COUNCILMAN PROF. ISMAEL
Representative of the Legislative Branch

KEY INSIGHT: Public hearings were superficial. There is an urgent need for a broad reforestation plan to mitigate damage.

MISSION 1: OUR DAILY SOIL

Student Action Plan

PROTOCOL: GLOBE PEDOSPHERE (SOIL TEMPERATURE)

The Task

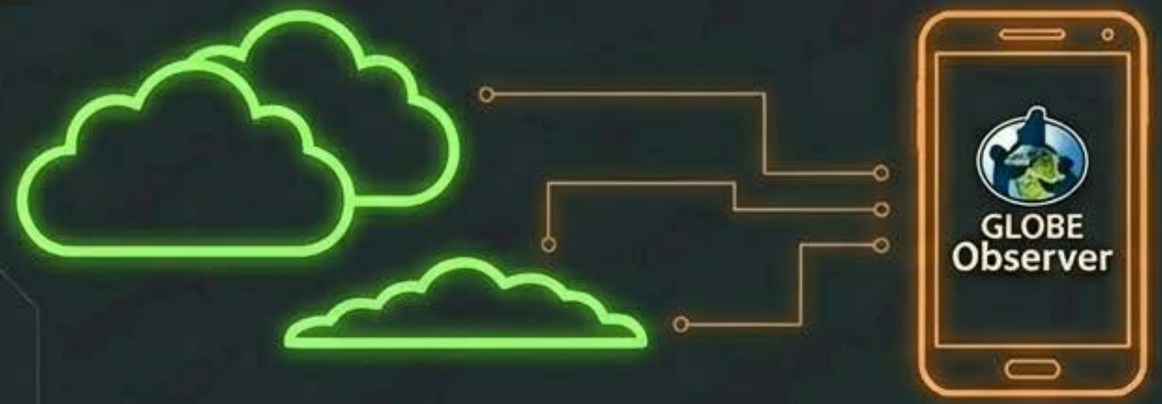
- 1. Compare soil around the school vs. wind farm areas.
- 2. Measure: Temperature, Moisture, Color, and Texture.
- 3. Identify: Signs of compaction and erosion.

Objective

Understand how landscape changes affect the ground beneath us.

MISSION 2: SKY WATCHERS

Student Action Plan



PROTOCOL: GLOBE ATMOSPHERE (CLOUDS)

The Task

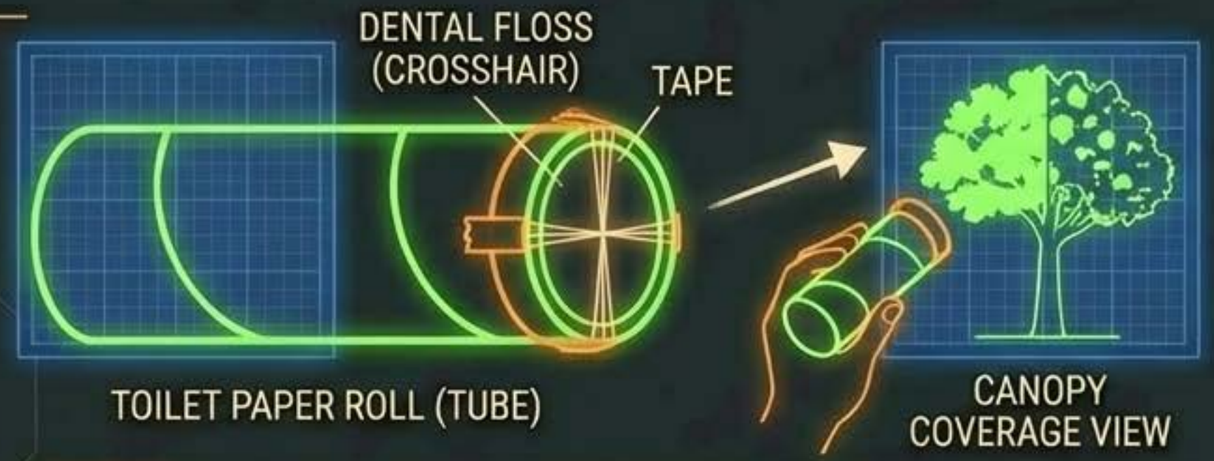
1. Observe and draw clouds daily.
2. Describe using everyday language.
3. Compare observations with the GLOBE Cloud Chart.

Objective

Connect local weather patterns to the wind farm environment.

MISSION 3: MEASURING THE GREEN

Student Action Plan



PROTOCOL: GLOBE BIOSPHERE (BIOMETRICS)

The Task

1. **Build** a Densiometer using low-cost materials.
2. **Look through** the tube to count canopy coverage.
3. **Measure** percentages along a transect line.

Objective

Verify deforestation and vegetation recovery.

THE VERDICT

CHECKLIST ASSESSMENT

Roboto Mono
STATUS:
ASSESSED

- Wind Energy is Renewable & Vital
- Alteration of Fauna & Flora Confirmed
- Structural Risks & Noise Pollution Confirmed
- Signal Interference in Rural Areas

CONCLUSION

Implementation requires detailed environmental studies to minimize negative effects.

SOLUTION

Scientific Initiation + Environmental Education = Sustainable Technologies.

REFERENCES & TEAM

EETI Rui Barbosa

GLOBE Program

NASA

TEAM

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SOURCES

ABEEólica (2017/2025)

NASA GLOBE Program Teacher's Guides (2023)

Interviews conducted by LUAR Potengi Team

SCIENCE FOR A SUSTAINABLE FUTURE.