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A Case Study about the Vegetation Influence in Urban Environment Conditions

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Brazilian context

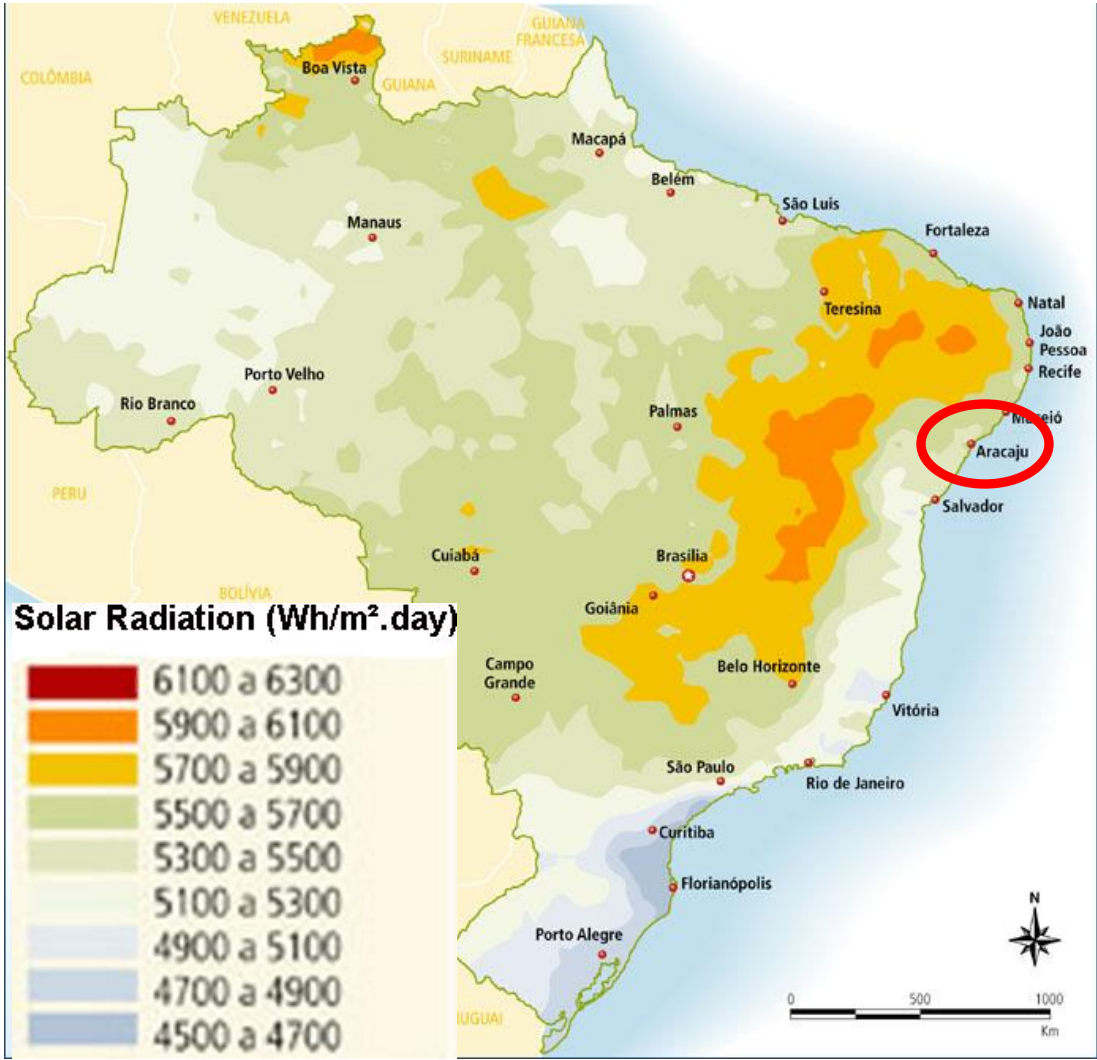
- The urbanization process promotes sparse vegetation areas.
- Vegetation in a tropical climate supports thermal balance in environment.

- Less vegetation implies:
  - more sidewalks and building envelopes exposed to the sun
  - less humidity control of soil and air

Aracaju downtown in 1940 and today

CLIMATE CONDITIONS

- Aracaju is a capital of Sergipe state in the Northeast of Brazil.
- It has a coastal tropical climate with high temperatures during the year – an annual average of 29ºC
- Daily average solar radiation is around 5500Wh/m²day

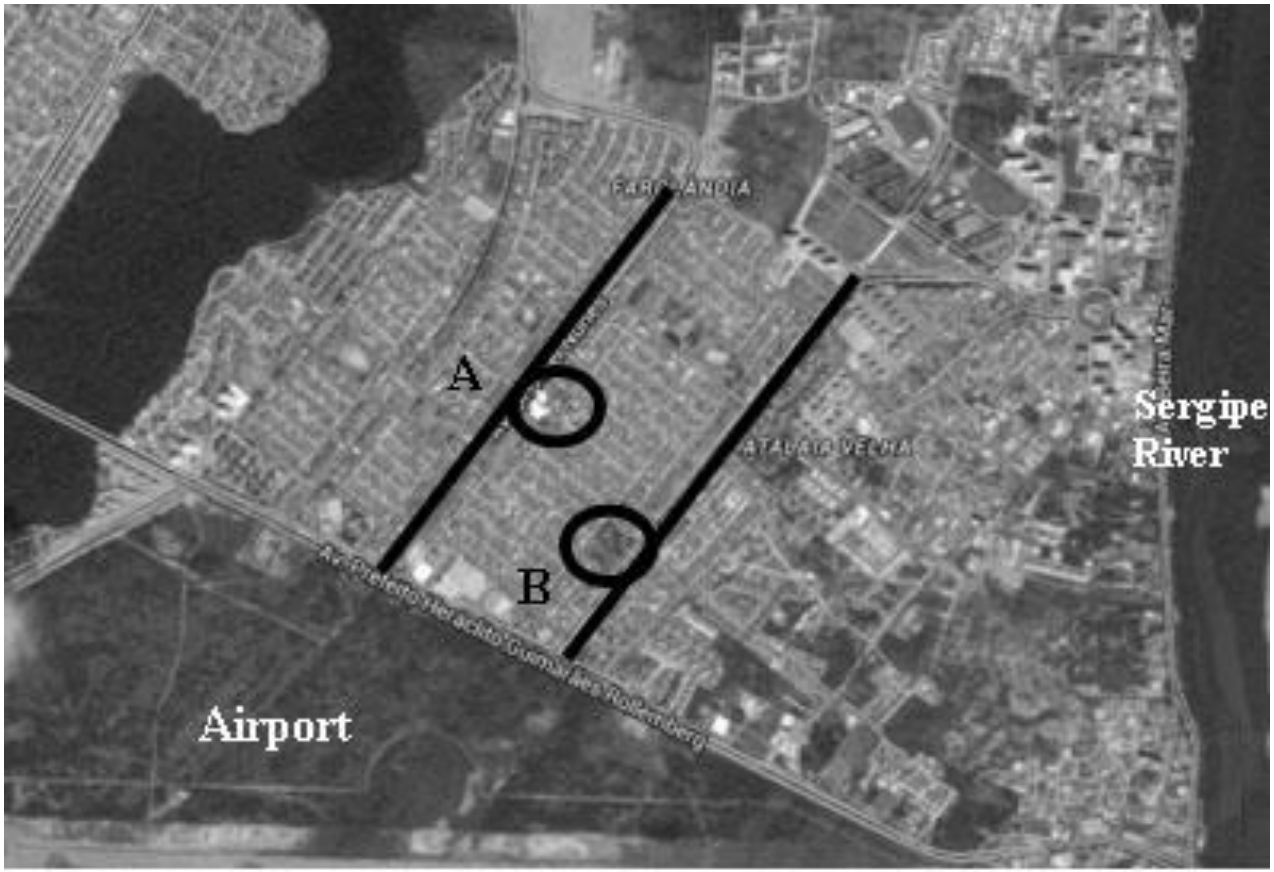


OBJECTIVE

• The propose is to register and study thermal conditions in the environment and vegetation presence in a neighbourhood of Aracaju - there are few studies about microclimate conditions.

METHODS

- Monitoring of air temperature, relative humidity and surface temperatures
- Applying interviews



Point A

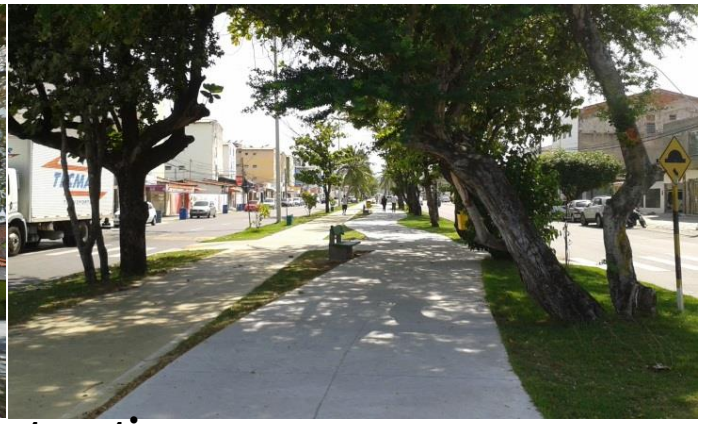
- There were some trees and a small canal on the Avenue. However, after reconstruction it was necessary to plant new trees and grass in addition to drainage of the canal.
- The square has few trees, only impermeable pavement and some small buildings.


Before and after Avenue reconstruction



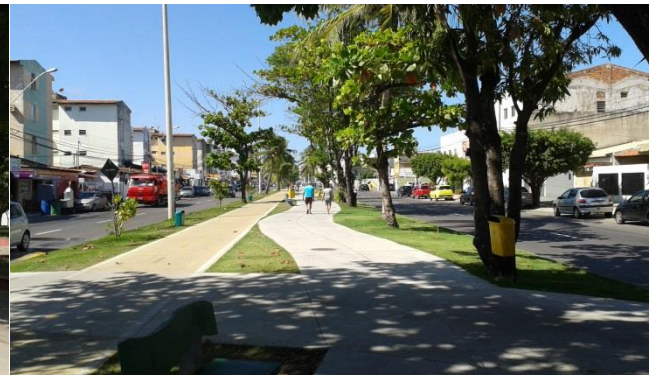
Point B

- There are still trees on Avenue after reconstruction. In addition grass was planted and the canal was drained.
- The square has many trees, large permeable area (grass and soil) and impermeable sidewalks.

Before and after Avenue reconstruction





Equipment

- Infrared Termomether range - 20°C to 530°C
- Globe Termomether ITWTG2000 - range 0°C to 50°C, accuracy +/- 0,6
- Measurements were taken in the summer

	Climate Variables	Point A1		Point A2		Point B1		Point B2	
		Shadow	Sun	Shadow	Sun	Shadow	Sun	Shadow	Sun
Morning	WBGT (°C)	30.6	31.8	30.7	31.7	31.6	31.8	31.3	32.2
	GT (°C)	35.4	39.6	37.9	41.3	37.8	40.1	38.5	41.8
	AT (°C)	31.9	32.9	31.2	32.7	32.4	32.7	31.6	32.3
	RH (%)	81	77.6	80.1	78.9	82.2	78.5	84	81.2
Afternoon	WBGT (°C)	31.6	32.9	31.5	32.1	29.9	31.3	29.6	31.2
	GT (°C)	37.5	41.1	39.2	40.4	36.9	39.6	32.7	37.9
	AT (°C)	32.6	34.7	32.2	33.6	30.3	31.6	30	32.1
	RH (%)	78.7	80.6	78.4	76.6	83.7	77.9	87.5	79.9

	Surfaces	Point A1		Point A2		Point B1		Point B2	
		Shadow	Sun	Shadow	Sun	Shadow	Sun	Shadow	Sun
Morning	Concrete	33.5	51.9	36.6	46.1	35.2	43.5	34.9	41.3
	Grass	-	-	31.7	44.3	-	-	33	38
Afternoon	Concrete	37.9	50	35	45.5	35.3	58.5	33.8	43.8
	Grass	-	-	30	40	-	-	30.1	41.1


Point A
Point B
Pizzaria Kalilândia
Colégio Lavoisier
Colégio Estadual
Ministro Petrônio Portela
Farmácia Gbarbosa
- Farolândia
Google

Considerations

It was observed:

- between 11 a.m. and 3 p.m. it was almost impossible to apply interviews (few people walking on streets – a lot of in cars)
- people recognized vegetation may support good levels in thermal conditions in a tropical climate, but they do not have any in their homes or close to them
- Trees were associated with wasting time for cleaning sidewalks, caring of pruning and plagues.

Considerations

Green areas could:

- contribute to attenuate sun exposure to users and built areas;
- contribute to conserve air and soil humidity
- attenuate the air temperature
- assist for more people keeping their cars in the garage
- assist to apply less air conditioning in cars and buildings

Thank you

Any questions contact me

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