

# PERFORMANCE OF A LOW-COST HANDMADE SUSPENDED SEDIMENT SAMPLER

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# 1. INTRODUCTION

- ✓ In developing countries, commercial hydrological monitoring equipment are generally **expensive**.

✓ handmade and low-cost instruments may be a viable alternative!



R\$ 3.560,00  
(≈ US\$ 943,00)



- ✓ It is important to quantify the suspended sediment concentration because it may negatively impact the bio-community and the water supply.

## 2. MATERIAL AND METHODS

### (PET) water bottle



length = 26 cm  
width = 7 cm  
**intake size = 7 mm**  
volume = 710 mL

inox rod



bottle water  
bike holder

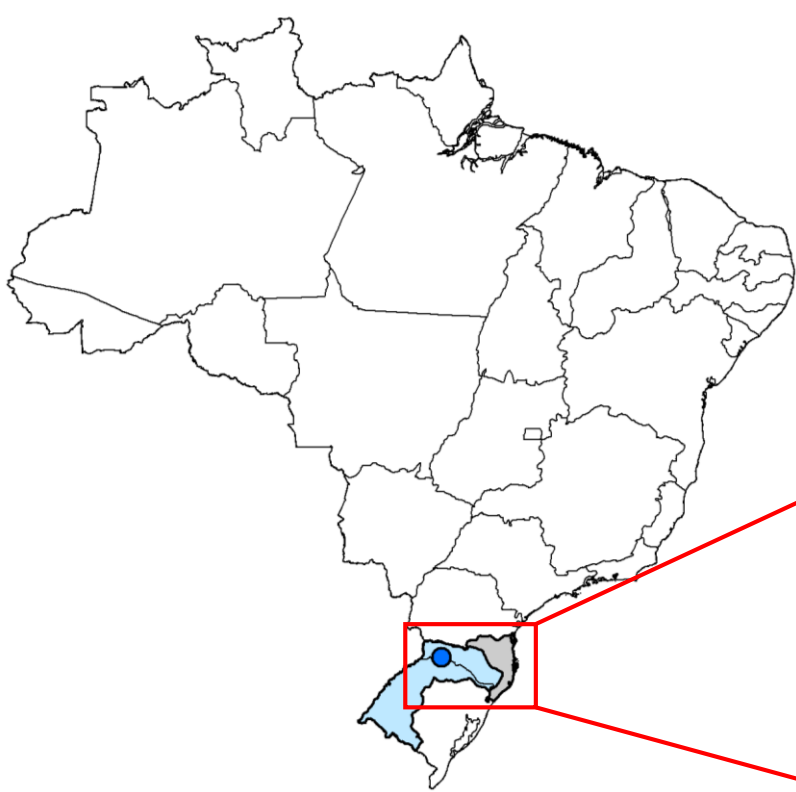


**Inox rod  
(1 m)**

**Total cost:  
R\$ 95,00  
US\$ 25,00**

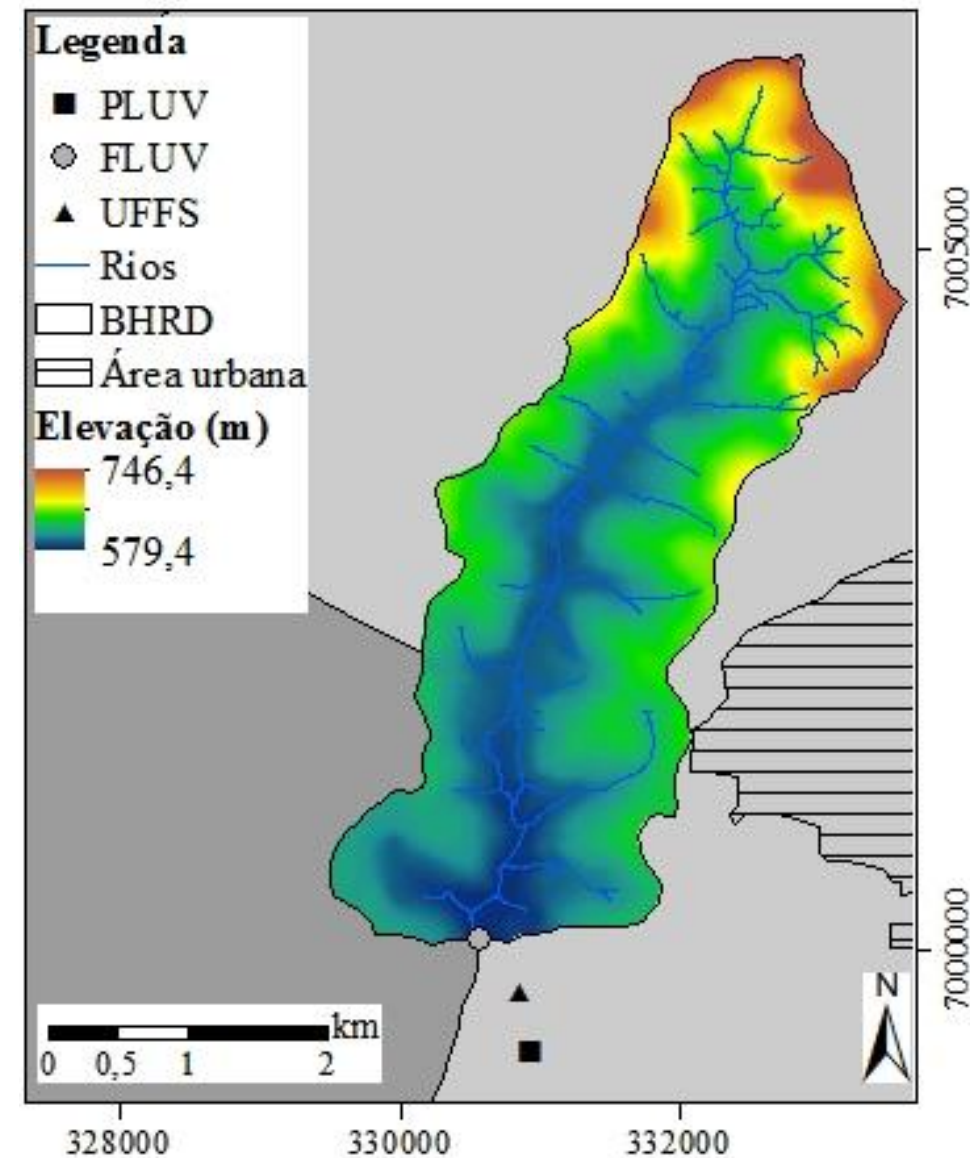
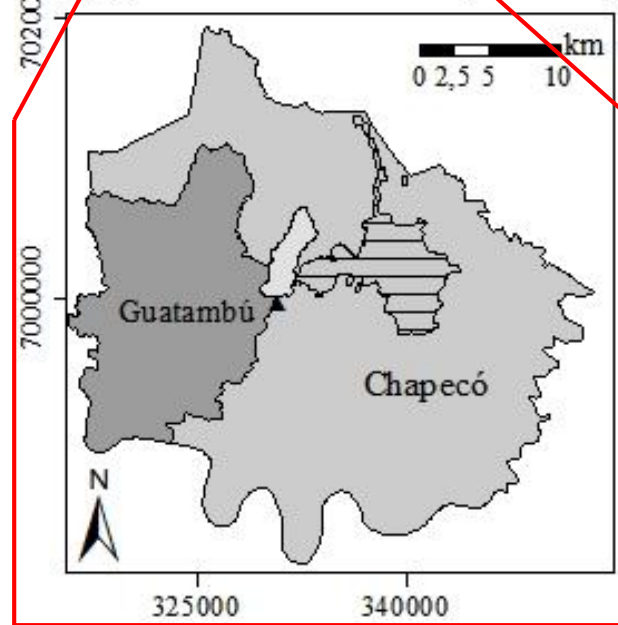
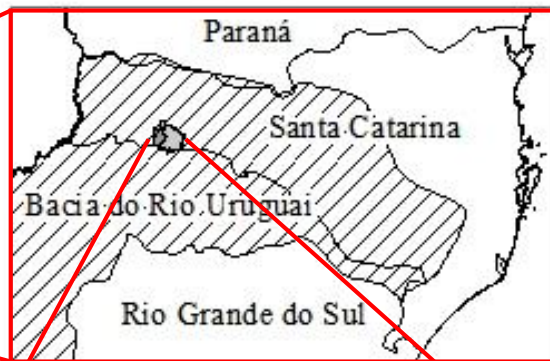
**Bottle  
water bike  
holder**

**Does it work?**



**Brazil**

# Study Site



**Divisa River  
Watershed**



## 2. MATERIAL AND METHODS

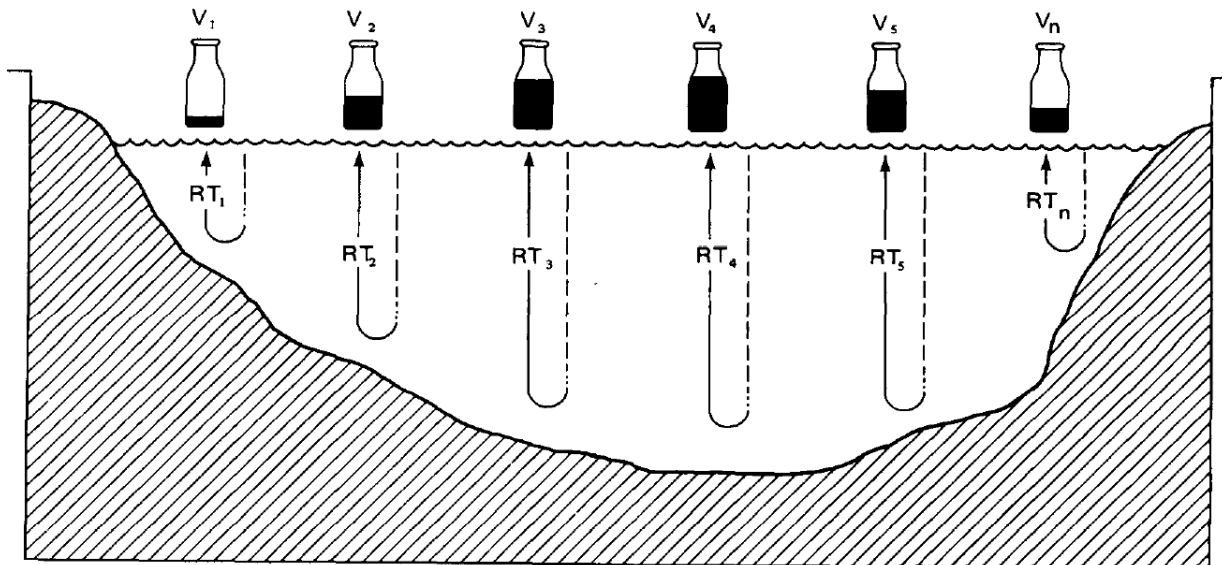
**17 samples** of water and sediments were taken via hand-held following the **equal widening method**

### EXPLANATION

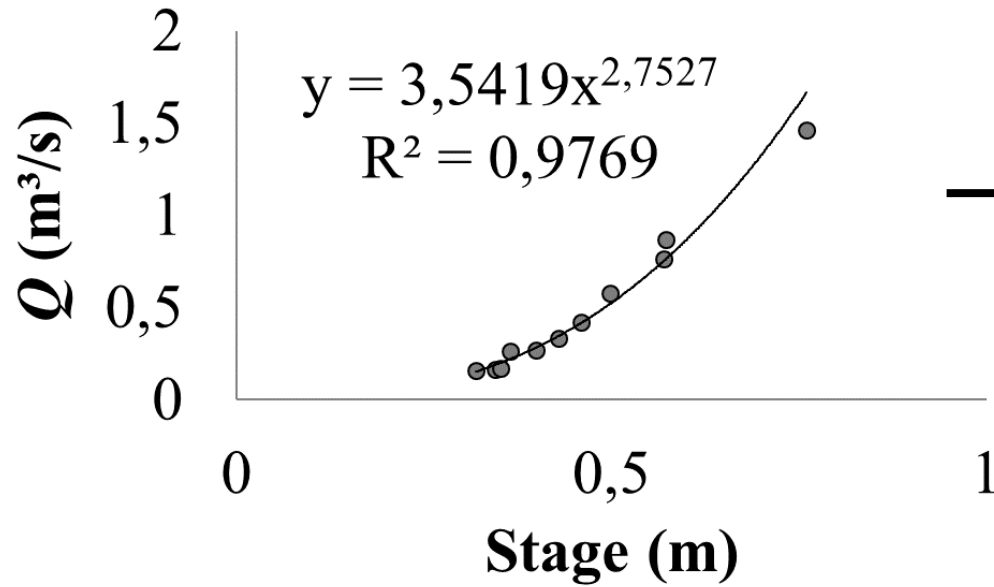
RT Transit rate at each vertical (equal)

$V$  Volume collected at each vertical (not equal, but proportional to the discharge at each increment)

Vertical in each increment (samples collected)

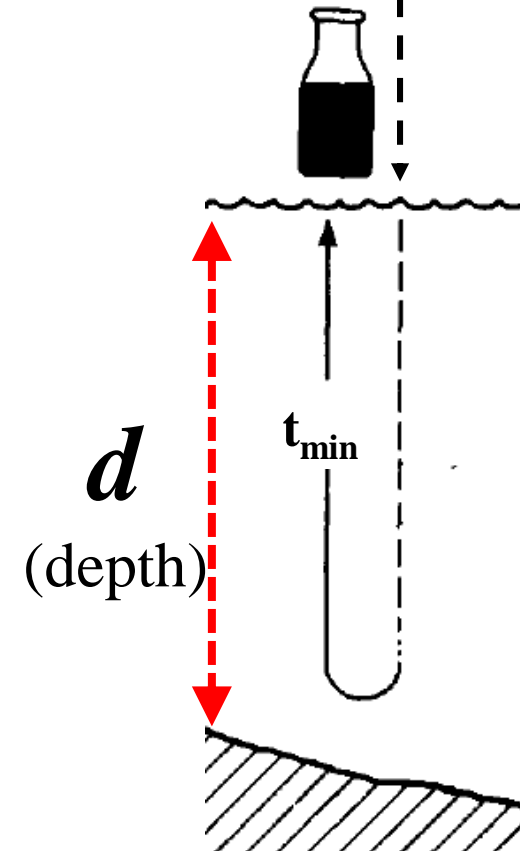
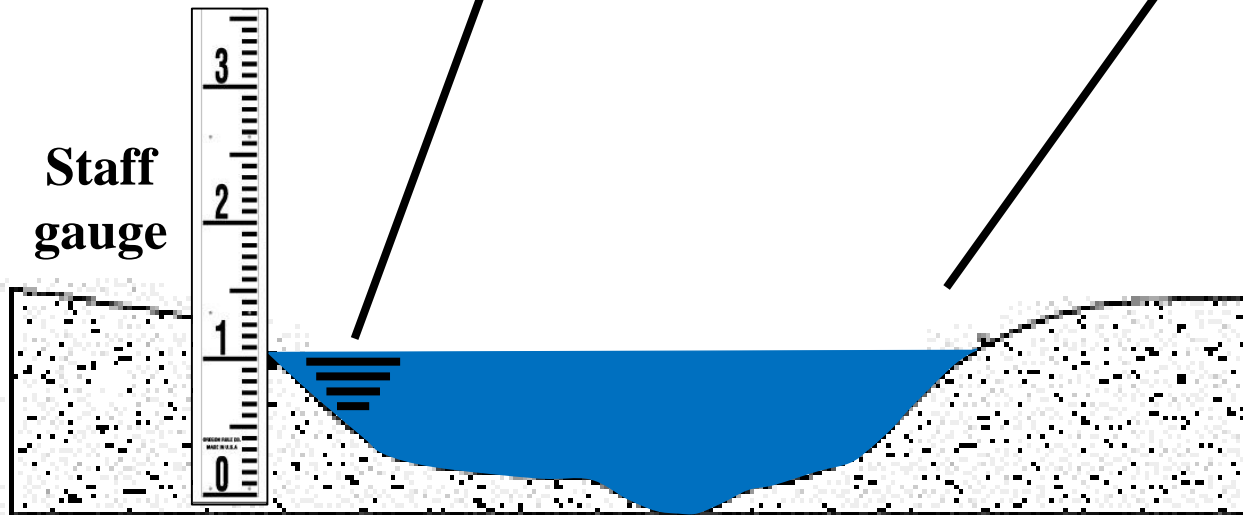


## 2. MATERIAL AND METHODS



$$\frac{Q}{A} = v_m$$

$$\frac{2 \times d}{v_m \times 0,4} = t_{\min}$$



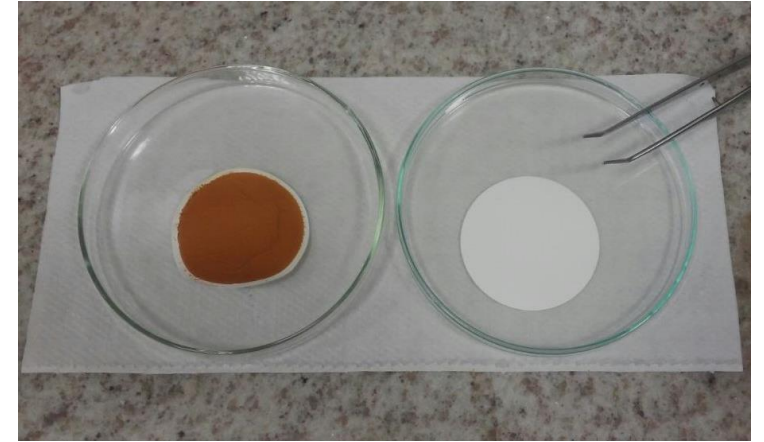


## 2. MATERIAL AND METHODS

In laboratory...



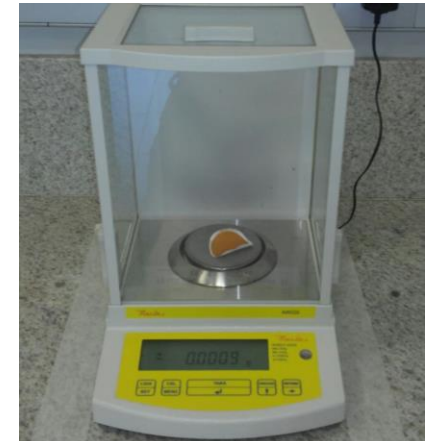
Turbidity of the samples was measured.



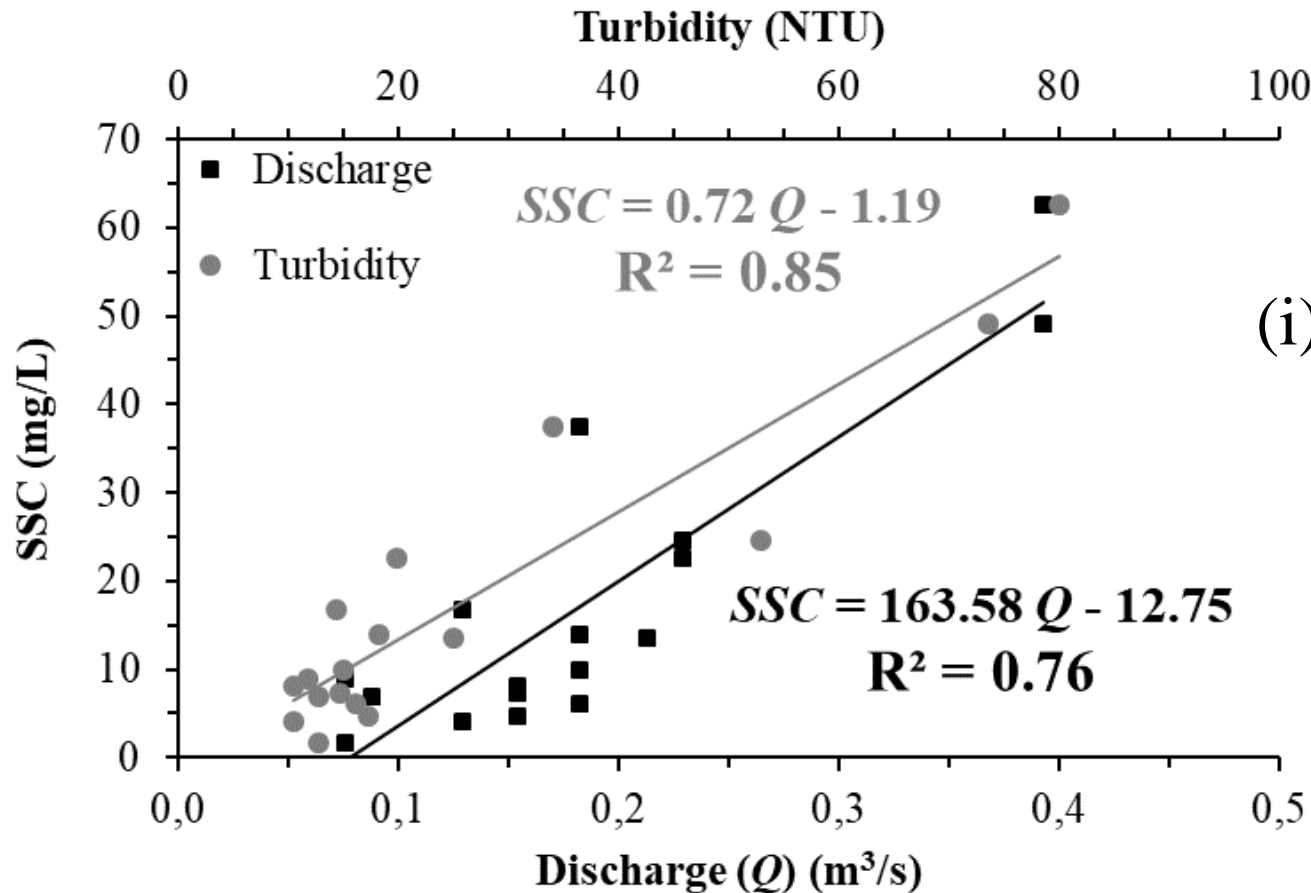
**0.5 L of each sample** was vacuum filtered using a polysulfone filtration system and cellulose acetate filters (**0.45  $\mu\text{m}$  pore size**).

The filters with sediment were dried 1 hour at 110 °C.

$$SSC = \frac{(m_f - m_i) \cdot 10^6}{Vol} [mg / L]$$



### 3. RESULTS AND DISCUSSION



**High correlations** between *SSC* and the variables **discharge and turbidity**.

We mainly attribute this fact to:

- (i) the adequate application of the **equal widening method**, including appropriately calculate the minimum transit time;
- (ii) the dimensions of the water bottle, specially its **water intake size**, that are quite **similar** to specific commercial and standardized samplers.



## 4. CONCLUSION



The handmade sampler is  $\approx 37$  times cheaper than the commercial !

The performance of the handmade sampler was satisfactory !

**It works!**

**THANK YOU!**



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