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RISK ANALYSIS FOR DOMESTIC WASTE MANAGEMENT PRACTICES IN RURAL BRAZIL

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BRAZILIAN FRAMEWORK

❖ Rural Brazil

- “area outside the urban perimeter of the district”
- underprivileged in many aspects
- 77.7% of Quilombolas families live there

❖ Rural Waste

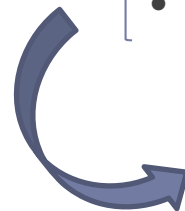
- very similar to urban waste
- only 26.9% of this population has solid waste collection
- similar conditions to China and Nepal for example

❖ Solid Waste



Risks

- human health impacts
- accidents
- pollution



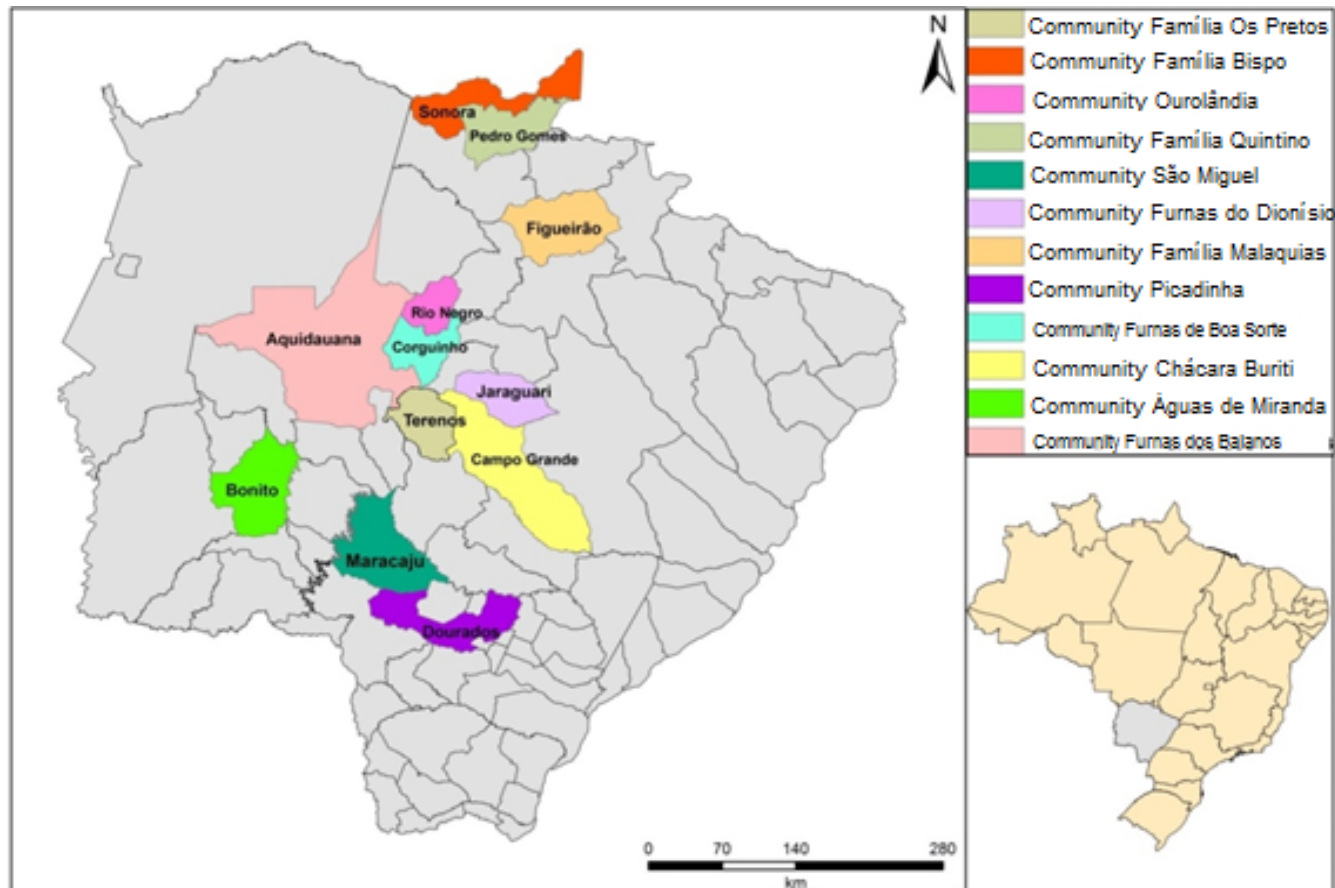
Risk Analysis

AIMS

- ❖ To propose sustainable alternatives for waste management in the rural area based on risk analysis to subsidize the decision-making process.
- ❖ Through a case study in the rural Quilombola communities of Mato Grosso do Sul.

METHODOLOGY

❖ Study Area



METHODOLOGY

ONE

- Problem Formulation

TWO

- Qualitative Risk Analysis

THREE

- Proposal of Alternatives

PROBLEM FORMULATION

❖ Questionnaire application



The sample was composed by 07 (seven) of the 12 communities

- ❖ Furnas do Dionísio
- ❖ Furnas de Boa Sorte
- ❖ Família Os Pretos
- ❖ Furnas dos Baianos
- ❖ Chácara Buriti
- ❖ Família Malaquias

QUALITATIVE RISK ANALYSIS

❖ From the scenarios obtained in the previous phase

Preliminary Hazard Analysis (PHA)

Scenario	Risk	Possible Causes	Effects	Frequency Class	Severity Class	Risk Classification

CATEGORY	DENOMINATION	
I	Negligible	- No damage or n - Injuries and/or d of first aid or min
II	Marginal	- Slight damage to - Light injuries.
III	Critical	- Severe damage to - Moderate injuries
IV	Catastrophic	- Irreparable damage - It causes death

Risk Classification		Frequency				
Consequence		A	B	C	D	E
	V					
	IV					
	III					
	II					
	I					

Caption:

Low
Moderate
High

ALTERNATIVES PROPOSAL

- ❖ Future scenarios design
 - ❖ Second Risk Analysis
- ❖ Alternatives definition
 - ❖ Comparison between the risk analysis results

RESULTS E DISCUSSION

✓ **Socio Economic Profile**

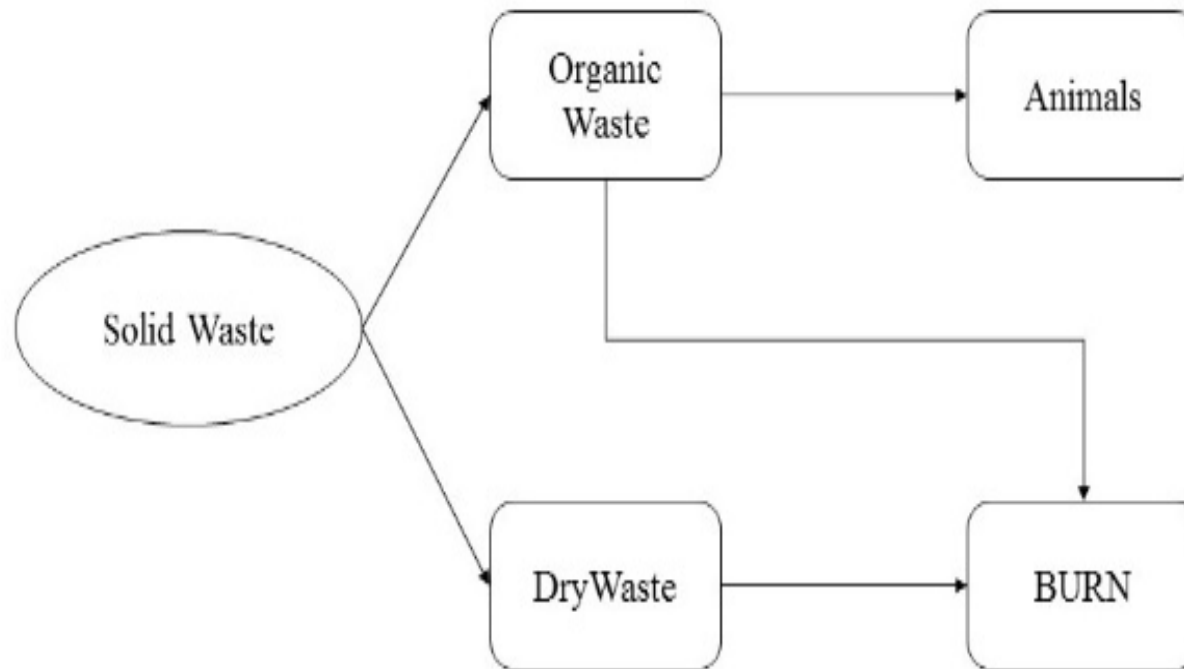
- ❖ 89.4% of the households inhabit the communities for over 10 years;
- ❖ 74% of the households have shared wells as water supply;
- ❖ None of the communities have wastewater collection and 91.8% of the residents use pits.

RESULTS E DISCUSSION

✓ **Waste Management**

- ❖ 30% of the communities have waste collection;
- ❖ 45.9% of the residents declared to know about selective waste collection;
- ❖ 87.1% know what recycling is;

RESULTS E DISCUSSION



RESULTS E DISCUSSION

Scenario	Risks	Risk Classification	Total Risks
01	Accidents	Moderate	07
	Proliferation of vectors	High	
	Greenhouse gases emission	Moderate	
	Inhalation of atmosferic emissions	High	
	Inhalation of odors	Moderate	
	Exposure to the collecting vehicle	Moderate	
	Accidents	Moderate	
02	Accidents	Moderate	04
	Proliferation of vectors	Moderate	
	Inhalation of atmosferic emissions	High	
	Fire	Moderate	
03	Accidents	Moderate	04
	Proliferation of vectors	Moderate	
	Inhalation of atmosferic emissions	High	
	Fire	Moderate	

RESULTS E DISCUSSION

Scenario	Risks	Risk Classification	Total Risks
Proposed 01	Accidents from source separation	Moderate	04
	Accidents from glass and metal handling	Moderate	
	Diseases	Moderate	
	Inhalation of odours	Low	
Proposed 02	Accidents from source separation	Moderate	07
	Accidents from container handling	Moderate	
	Accidents from the collector vehicle	Moderate	
	Diseases	Moderate	
	Inhalation of atmosferic emissions	High	
	Inhalation of odours	Low	
	Continuous exposure to the collection vehicle	Moderate	
Proposed 03	Accidents from source separation	Moderate	05
	Accidents from glass and metal handling	Moderate	
	Accidents from source separation	Moderate	
	Diseases	Moderate	
	Inhalation of odours	Low	

RESULTS E DISCUSSION

✓ **Proposal of Alternatives**

❖ **Proposed Alternatives**

- ❖ the best scenario for all the communities is the “proposed scenario 01”
- ❖ source separation + home composting + give the leftovers of food to the animals + sale of the recyclables
- ❖ the communities that already have waste collection (Família Malaquias and Chácara Buriti) might not give it up to reduce their exposure to risks
- ❖ the qualitative risk analysis is not enough to support decision-making in this context, demanding other criteria to complement it

CONCLUSIONS

- ❖ The major risks to which the residents are vulnerable to are the **proliferation of vectors** and **inhalation of atmospheric emissions** that can cause several types of diseases, including lung cancer.
- ❖ **Lower intensities risks** were found in the three scenarios proposed.
- ❖ **Waste handling plays a significant role in the risks** and its intensities.

CONCLUSIONS

- ❖ The **risk analysis** was found to be an **adequate tool**, helping to minimize the risks to the communities.
- ❖ It was not found other applications of the risk analysis in the literature with the same approach – **qualitative and for rural waste**.
- ❖ Considering only risk analysis all the communities should perform **source separation, home composting and the sale of the recyclables**.

MUITO OBRIGADA!!
