

Development and First Application of an Integrated Methodology for Risk Assessment of Mining Projects in French Guiana at the Territory Scale

Ottone Scammacca, Y. Gunzburger, Rasool Mehdizadeh

▶ To cite this version:

Ottone Scammacca, Y. Gunzburger, Rasool Mehdizadeh. Development and First Application of an Integrated Methodology for Risk Assessment of Mining Projects in French Guiana at the Territory Scale. PhD Day, Dec 2019, Nancy, France. hal-03599083

HAL Id: hal-03599083

https://hal.science/hal-03599083

Submitted on 6 Mar 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.













Development and First Application of an Integrated Methodology for Risk Assessment of Mining Projects in French Guiana at the Territory Scale

SCAMMACCA Ottone¹, GUNZBURGER Yann¹, MEHDIZADEH Rasool¹

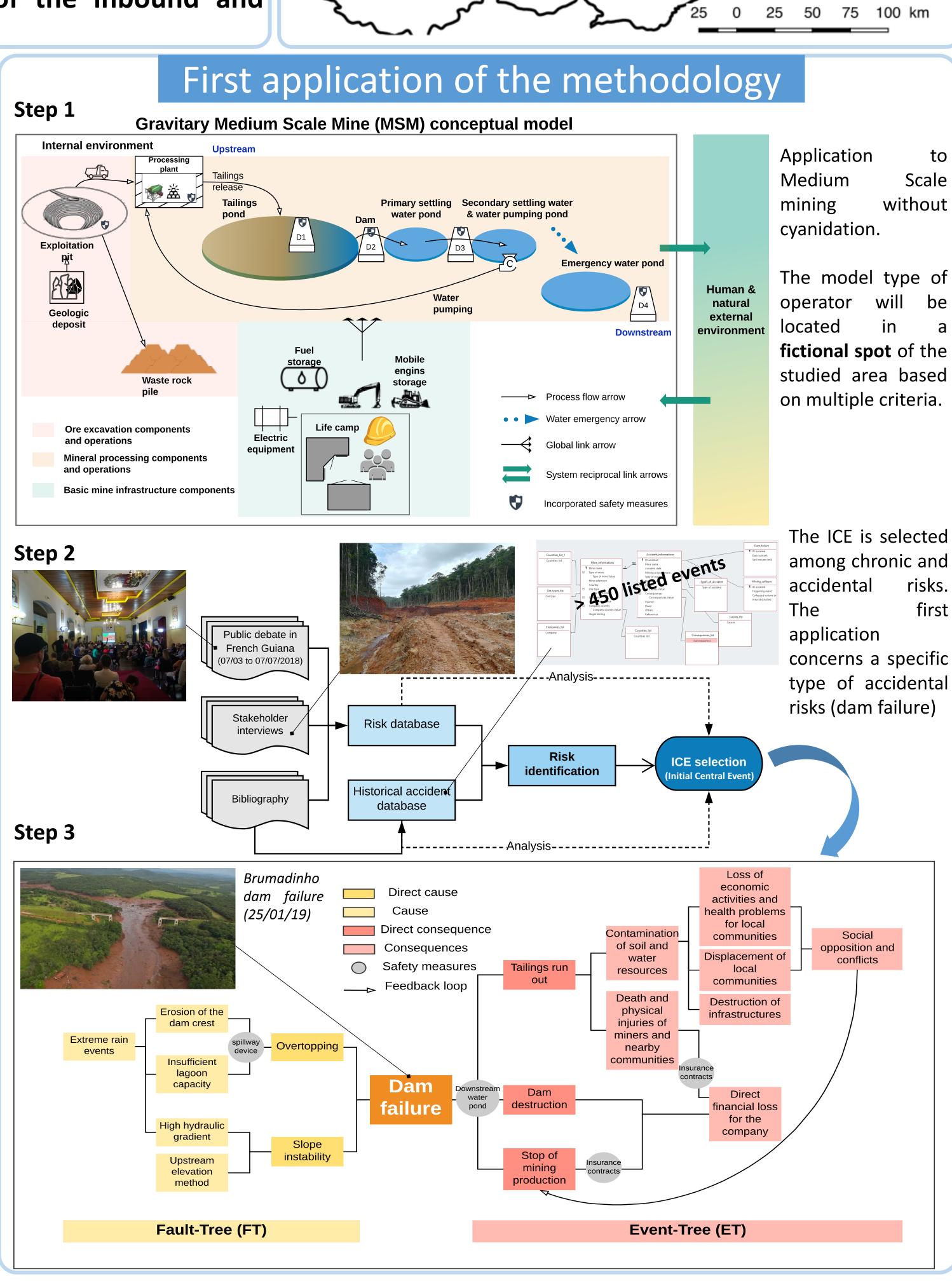
¹GeoRessources - Université de Lorraine, CNRS, CREGU, Mines Nancy, France

Context and objectives **Context:** Mining activities as integral part of a Socio-Ecological System Gold mining plays a key role in the territorial complexity of French Guiana. Nevertheless, this activity is very controversial and most of Perception the debates related to gold exploitation are based on the accidental **Exploitation** and chronic risks which may be caused. These oppositions can lead consumption sometimes also to the temporary or permanent interruption of a and use mining project. **Ecosystem** Human Hence, the idea behind this thesis is to consider a mining project processes processes through a holistic approach at the territory scale as a matter of land-**Ecosystem** planning rather than a simple industrial object. health Main types of gold mining operator Individuals **Artisanal & Small Scale** Medium Scale **Large Scale** Physiologica Security & protection Biodiversity **Mining project Exploitation** fluctuations, ...)

Selected area for the study Primary Au deposits Suriname Alluvial Au deposits Drinking water source points Mana river Biotope Reserve Kokioko Main city and villages Valid AEX and PEX SDOM2 SDOM 1 / SDOM 3 and 4 Communal boundaries Mana river water catchment French Guiana Brazil

OBJECTIVE: To develop a methodology for risk assessment which integrates i) the specific nature and types of mining projects in French Guiana; ii) the spatio-temporal variability of risks; iii) the diversity of stakeholders of a mining project; iv) the different natures of the inbound and outbound risks.

Presentation of the methodology Step 1 Step 0 Conceptual modelling Description of the Vocabulary of the initial system boundary conditions definition (functions, peformances, Step 2 Risk representation Selection of a risk as through a Risk identification Initial Central Event stock-flow (causes & consequences) (ICE) approach Identification and Where the conceptual modelling smaller system is related to the ICE of the other systems Participatory methods and communication Step 3 with stakeholders Create Fault and Pattern selection in the included during **Event Trees for the** Bow-Tie as risk the whole ICE (Bow-Tie method) scenario assessment Step 4 Probability Identification of risk Utilization of specific models for **Indicators** indicators and quantification/semi-quantification for each Consequence risk variable (geotechnical, environmental, social) thresholds Indicators Risk matrix approach Step 5 Integration of the models Step 6 Risk mapping



Work Plan for the next year

- 1. Evaluate dam failure consequences using empirical methods chosen in the literature: adaptation and optimization of the method
- 2. Include stakeholder weights for consequence evaluation
- 3. Evaluate dam failure probability and combine probability and consequences to obtain risk maps
- 4. Apply the methodology to each mining operator type

