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**Challenges and best practices in disaster management**

**Larissa Felicidade Werkhauser Demara**

*Palestra apresentada no : SOUTH  
AFRICAN LOCAL GOVERNMENT  
ASSOCIATION, SALGA, NATIONAL  
COMMUNICATORS'S FORUM, 8., 2025,  
Eastern Cape. **Lecture... 21 slides.***

*A série "Comunicação Técnica" compreende trabalhos elaborados por técnicos do IPT, apresentados em eventos, publicados em revistas especializadas ou quando seu conteúdo apresentar relevância pública.*

**PROIBIDO REPRODUÇÃO**



# CHALLENGES AND BEST PRACTICES IN DISASTER MANAGEMENT

Larissa Felicidade Werkhauser Demarco  
Johannesburg, South Africa  
Feb. 26<sup>th</sup> 2025

THANKS FOR  
THE INVITATION!  
THANKS SALGA  
AND THE  
ORGANIZATION



LOCAL GOVERNMENT  
DISASTER MANAGEMENT

# *Indaba*



**INVITATION** —————  
**25 - 26 FEBRUARY 2025**  
**RADISSON HOTEL & CONVENTION**  
**CENTRE, OR TAMBO**



**REGISTER HERE**





# WHO ARE WE ?

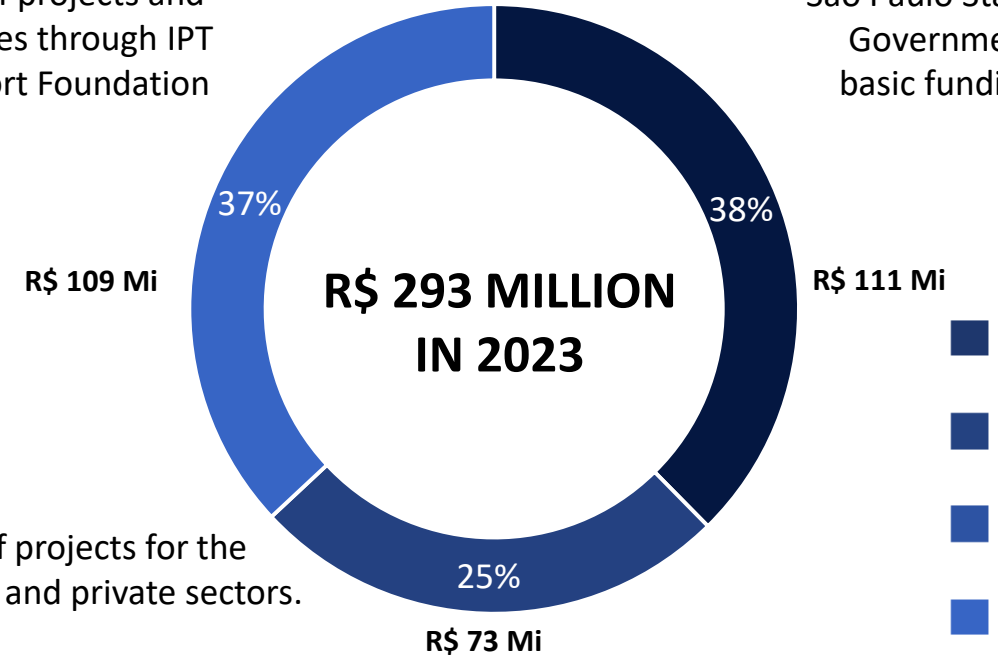
IPT PROVIDES TECHNICAL SOLUTIONS FOR INDUSTRY, GOVERNMENTS AND SOCIETY, ENABLING THEM TO OVERCOME THE CHALLENGES OF OUR TIME



## INCOMES

Sale of projects and services through IPT Support Foundation (FIPT)

São Paulo State Government basic funding



## OUR NUMBERS\*



125 YEARS OF CONTRIBUTIONS TO SOCIETY



> 1,000 EMPLOYEES AND PARTNERS



120 k square meters of labs



> 2,900 CUSTOMERS SERVED



> 19,450 TECHNICAL DOCUMENTS ISSUED



> 2,000 TESTING AND ANALYSIS PROCEDURES IN THE PORTFOLIO

# IPT

**IPT**

Trem > Villa Lobos -  
Jardim

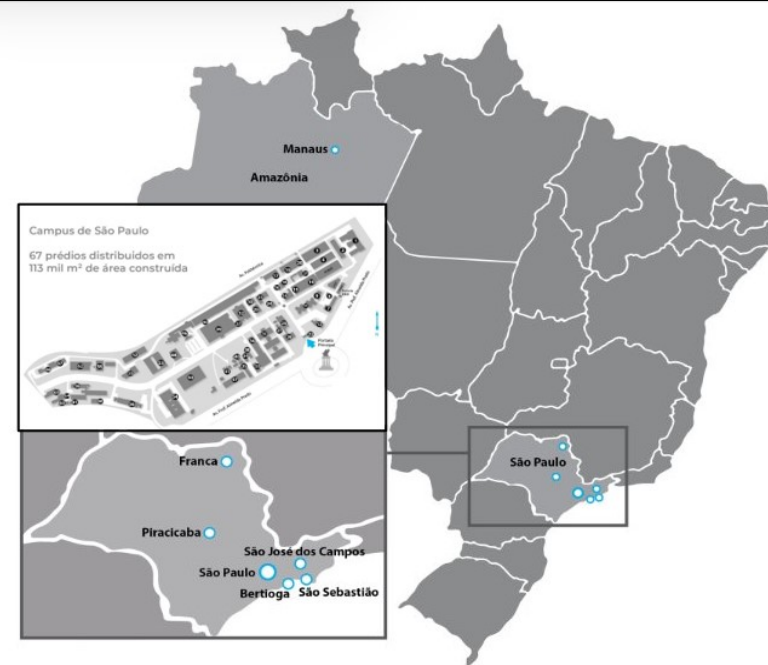
**USP**

Trem > Cidade  
Universitária

Metrô >  
Butantã

IPT is located right next to the University of São Paulo (USP), a national epicenter of scientific production and talent & social development.

+7,000 students graduate each year, including +600 engineers, +3,800 MScs e +3,000 PhDs.



São Paulo is a  
main center of  
economic,  
industrial,  
academic and

# WHAT WE DO ?

RESEARCH,  
DEVELOPMENT AND  
INNOVATION

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PRODUCTS AND  
PROCESSES  
SOFTWARES  
FROM THE BENCH TO  
THE PILOT  
FUNDING  
EMBRAPII

TESTS, TRIALS  
AND ANALYSIS

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TECHNICAL ANALYSIS OF  
PRODUCTS AND  
MATERIALS  
PRODUCT EVALUATION  
PRODUCT  
CERTIFICATION

INSPECTION AND  
MONITORING

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CONSTRUCTION AND  
STRUCTURES  
MACHINERY AND  
EQUIPMENT  
ACCREDITED INSPECTION  
BODY

METROLOGICAL  
DEVELOPMENT,  
MEASUREMENTS  
AND CALIBRATIONS

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PROFICIENCY PROGRAMS  
STANDARDS  
DEVELOPMENT  
ADVANCED METROLOGY

CERTIFIED  
REFERENCE  
MATERIALS

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METALS  
CERAMIC  
MINERAL  
VISCOSITY  
NORMAL SAND

TECNOLOGICAL  
EDUCATION

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PROFESSIONAL MASTER  
EXTENSION COURSES  
COURSES ON DEMAND



# BUSINESS UNITS

## BIONANOMANUFACTURING

Processes, Chemistry, PPEs, Biotech, Nanotech, Microfabrication

## CITIES, INFRASTRUCTURE AND ENVIRONMENT

Territorial planning, Sustainability, Risks, Civil works

## ENERGY

Generation, Infrastructure, Efficiency, Clean energy

## BUILDING AND HOUSING

Confort, Performance, Safety, Materials, Sustainability

## ADVANCED MATERIALS

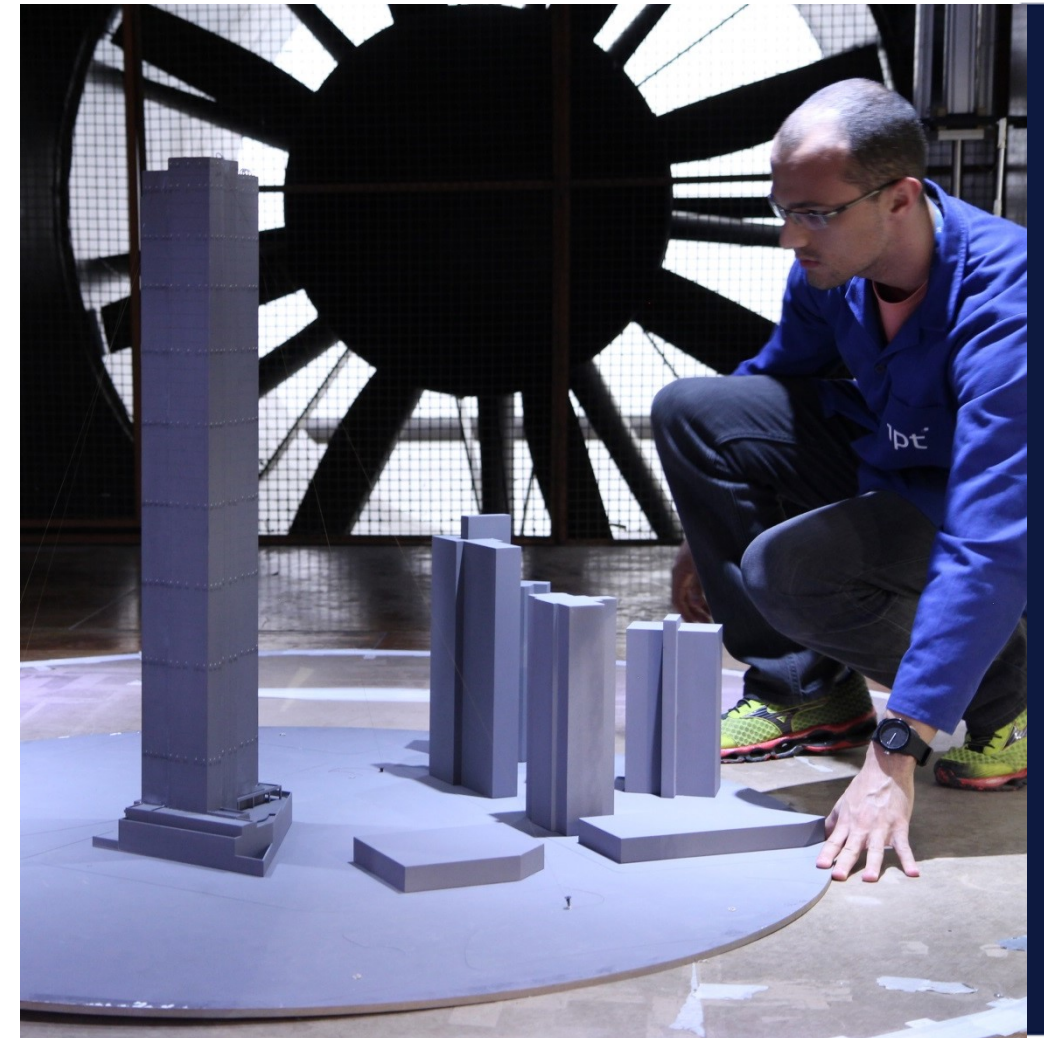
Metallic, Polymeric, Composite, Cellulosic, Corrosion

## DIGITAL TRANSFORMATION

IoT, Embedded Systems, Intelligent Transport Systems, AI, Analytics

## METROLOGICAL AND REGULATORY TECHNOLOGIES

Mechanics, Electrical, Flow Measurement, Aerodynamics, Chemistry





# BRAZIL: POLITICAL-ADMINISTRATIVE STRUCTURE



- 216,4 million people (~9 in risk areas)
- 8,5 million km<sup>2</sup>
- 26 States + Federal District
- 5.569 municipalities

Governance levels

- Federal
- State
- Municipal

## FOCUS: STATE OF **SÃO PAULO**

- 44 million people (675 k in risk areas)
- 645 municipalities



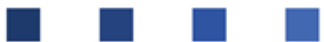
# START OF CIVIL DEFENSE PREVENTIVE PLAN IN SÃO PAULO (1988)

- Partnership between State, Municipalities and Technical Institutions (IPT and others)
- CDPP is an action plan based on monitoring by:
  - Rainfall rates (past)
  - Weather forecast (future)
  - Field inspection (present)



Warley Kenji/PMMC

- Starting with 8 municipalities: landslides in the Serra do Mar mountains.
- To have good plans, it is necessary to know the territory, i.e. to have risk maps



# AND ALMOST 40 YEARS LATER?

Although the state of São Paulo has a consolidated system for dealing with rainy periods, **there are still challenges considering the national problem of occupying risk areas, intensified by the climate emergency.**

## **THE PLAN EVOLVED:**

- + Municipalities
- + Monitoring Tools
- + Institutions

**WHAT ARE THE CHALLENGES AND BEST PRACTICES?**





# CHALLENGES

- ACTIONS CONSIDERING THE **TERRITORIAL DIVERSITY** (BRAZIL IS LARGE AND HAS A HUGE GEODIVERSITY – landslides and erosions, storms, droughts and fires)
- HOW TO INCORPORATE THE **CLIMATE CHANGE SCENARIO** INTO CURRENT MONITORING?
- SOURCES OF **FUNDING TO STIMULATE THE IMPLEMENTATION** OF MUNICIPAL CIVIL DEFENSE ACTIONS.





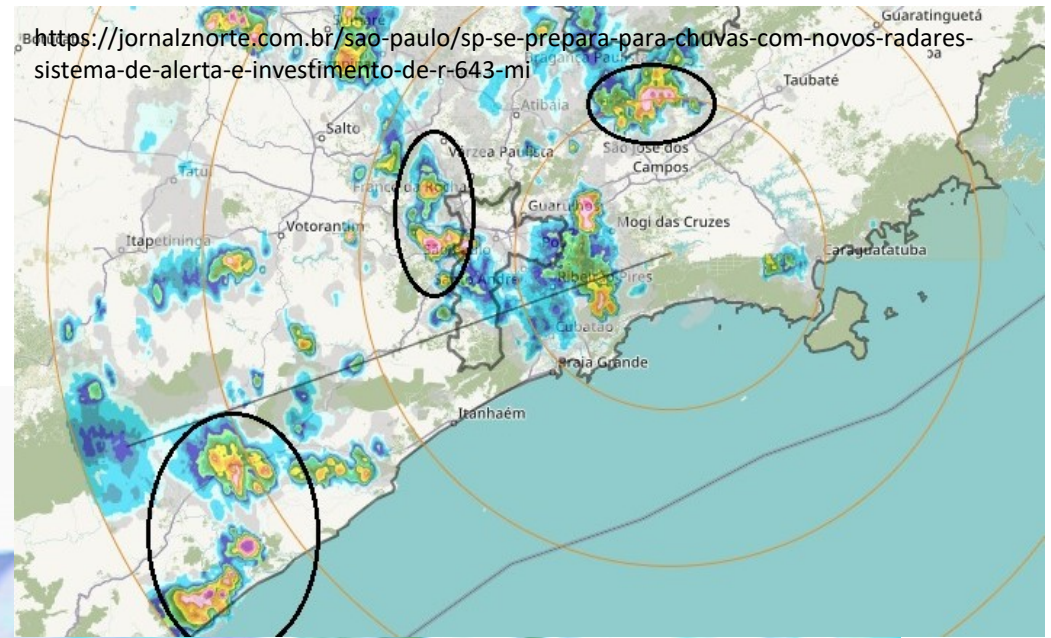
# CHALLENGES

- **IMPROVING COMMUNICATION** BETWEEN NATIONAL, STATE AND MUNICIPAL CIVIL DEFENSE TEAMS
- **HOW TO ALERT THE COMMUNITIES EARLY ENOUGH?**
- **TRAINING** MUNICIPAL CIVIL DEFENSE AGENTS
- **HOW TO BRING THE COMMUNITY INTO THIS DISCUSSION** TO PREVENT THE FORMATION OF NEW RISK AREAS AND PROMOTE SELF-RESCUE



# BEST PRACTICES OF THE STATE OF SÃO PAULO

- **Civil Defense Preventive Plan** of the State of São Paulo
- **Finances risk mapping** in municipalities (+ 250 since 2004)
- **Invests in new monitoring tools**
- **Invests in new tools to improve the alert system**
  - cell broadcast alert regardless of prior registration





# BEST PRACTICES: STRENGTHENING PARTNERSHIPS

- **Federal government:** produce educational material on risk mapping
- **Brazilian Geological Service:** support with indications for civil engineering works to mitigate risks
- **State Civil Defense:** mapping risks, support during emergencies, training of municipal civil defense agents
- **State Public Ministry:** technical assistance
- **Research institutions:** technical information to support the decision-making of public managers







**IPT**  
**PRÓ**

**MUNICIPALITIES**

- **TRAINING WORKSHOPS TO MUNICIPALITIES** with the state civil defense
- **INDEPENDENT TRAINING COURSES**
- **+ 3k people trained** by IPT since 2014
- **+ 90 actions** in education for a culture of prevention since 2014

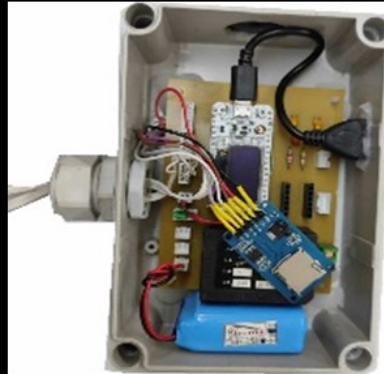
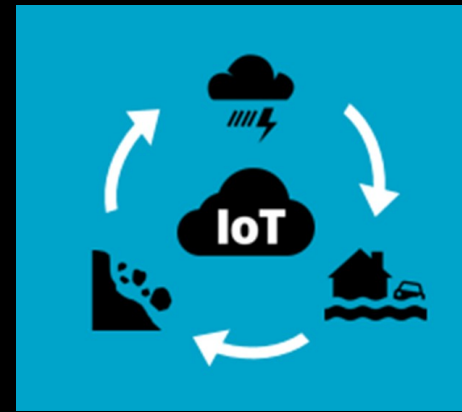




## BEST PRACTICES: COMMUNICATION AND EDUCATION

- Material for risk communication and education
- Dissemination Videos
- Knowledge Olympics
- Workshops, online courses, etc





## BEST PRACTICES: R&D&I

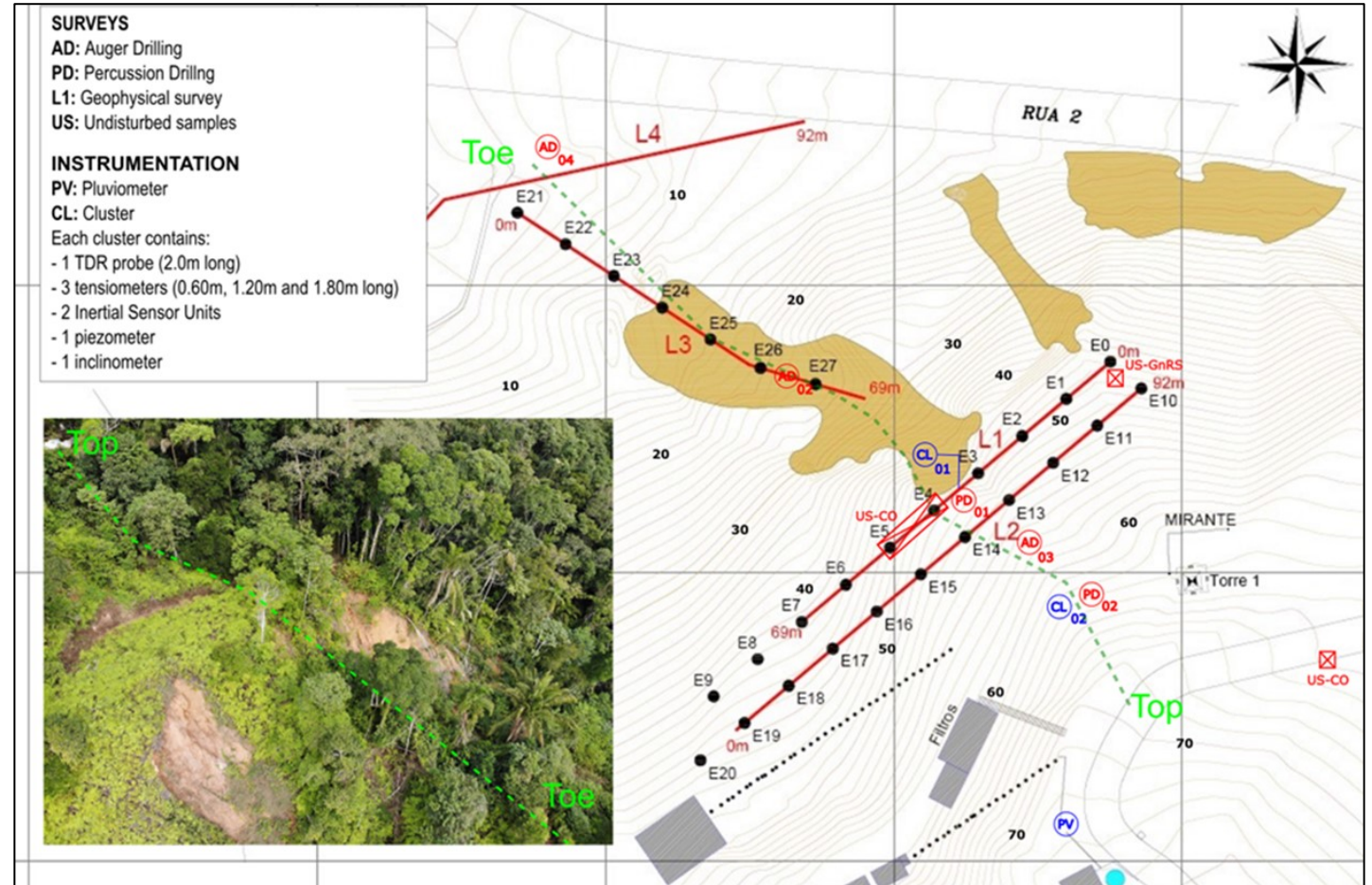
- Prediction of environmental disasters and emergency response based on technologies associated with Internet of Things using low cost sensors
- Study of landslide coefficients in laboratory models.



# BEST PRACTICES: R&D&I

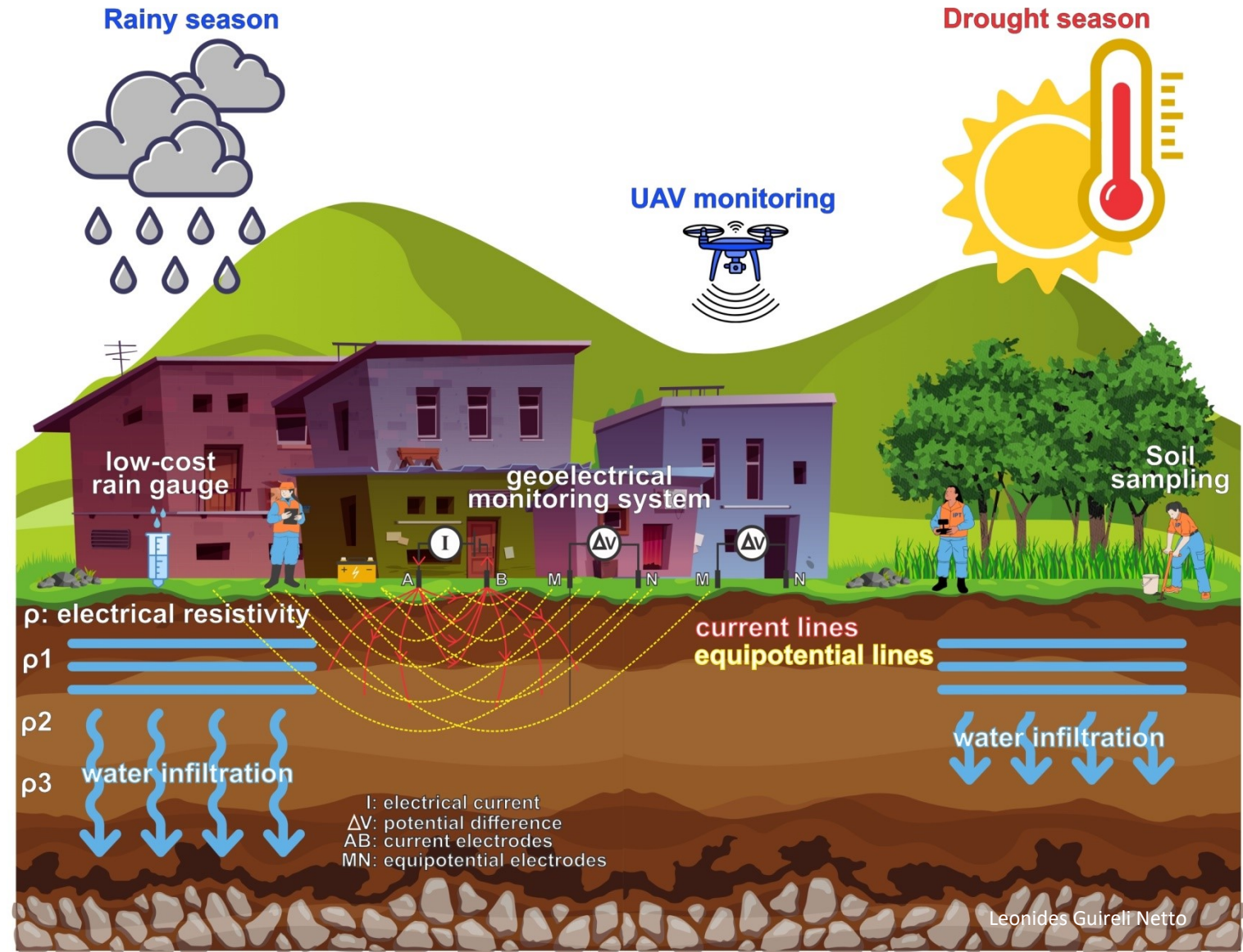
⑩ Prediction of environmental disasters and emergency response based on technologies associated with Internet of Things using low cost sensors

⑩ Study of mass movements in the field



# BEST PRACTICES: R&D&I

- Application of geotechnologies to improve the identification and monitoring of landslide risks in a vulnerable Community
- Co-creation of low-cost and collaborative solutions





# BEST PRACTICES: R&D&I

- Artificial Intelligence to predict landslide risk areas (GEORISK NCMAND)
- AI to identify atmospheric patterns that result in extreme events and their evolution



The image shows a 3D-rendered landscape with a landslide area highlighted in orange and red. A computer monitor in the foreground displays a map of Brazil with a risk assessment overlay. The word 'CONVITE' is written in large white letters on a dark blue background in the top right corner. At the bottom, the text 'GEORISK SISTEMA DE PREVISÃO DE RISCO DE DESLIZAMENTOS DE TERRA' is displayed in white on a dark blue background. A small credit line 'Foto: Marino Azevedo/ Governo do estado RJ' is visible in the bottom right corner of the image area.

**CONVITE**

**GEORISK** SISTEMA DE PREVISÃO DE RISCO DE DESLIZAMENTOS DE TERRA

Foto: Marino Azevedo/ Governo do estado RJ



# POSSIBILITIES OF PARTNERSHIPS

- TRAINING AND BUILDING CAPACITIES
- EXCHANGE OF PROFESSIONALS
- JOINT PRODUCTION OF EDUCATION AND INFORMATION MATERIAL
- JOINT R&D&I PROJECTS
- SEEKING NATIONAL AND INTERNATIONAL FUNDING





Thank you!

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