日本―アフリカ　国際共同研究「環境科学」 2022 年度　年次報告書	
研究課題名（和文）	鉱業活動の影響を受ける環境における汚染物質の迅速な検出、修復、および利害関係者の認識による持続可能な幸福
研究課題名（英文）	Sustainable well-being through rapid detection, remediation and stakeholder awareness of contaminants in environments impacted by mining activities
日本側研究代表者氏名	ジェズニチカ イザベラ イレナ
所属・役職	芝浦工業大学・工学部 先進国際課程・教授
研究期間	2022 年 4月 1 日～2025 年 3 月 31 日

1．日本側の研究実施体制

氏名	所属機関・部局・役職	役割
ジェズニチカ イザベラ イレナ（PI）	芝浦工業大学・工学部・教授	Smartphone-enabled copper quantification in water
フェスタガード ムンデランジ・キャサリン・ムタンゲーイ（Co-PI1）	鹿児島大学・農学部・准教授	Synthesis and characterization of nanostructured copper forms
オレチェク　シルヴィア (Co-PI2)	京都大学・大学院工学研究科・特定助教	Collection of soil and water samples. Analysis of microplastics/heavy metals (HMs)
堀野 秀幸	東北大学 特任准教授	Administrative and research advice

2．日本側研究チームの研究目標及び計画概要

The primary goal of Japanese team in year 2022 is to collect samples of water, soil and biomass from copper mining areas in Botswana with the help of teams from Botswana and South Africa. Co-PI2 (Kyoto University) will lead this task and also analyze microplastics and heavy metals. CoPI-1 (Kagoshima University) will synthesize nanostructured copper forms, utilizing conventional methods and agricultural biomass. PI, at Shibaura Institute of Technology, will perform studies

aiming detection and quantification of copper in water samples having physico-chemical properties of waters in selected mining town in Botswana.

3. 日本側研究チームの実施概要

The SusMine project aims at solving various environmental problems facing local communities living in areas of abandoned Selebi-Phikwe copper-nickel mine in Botswana.

In the first year of the project, Japan-side team obtained results on the content and spatial distribution of heavy metals (HMs) and microplastics (MPs) in soil and water in various locations around the mine; prepared copper nanostructured forms from synthetic and agricultural biomass waste, and made a prototype of a smartphone optical add-on to measure water turbidity changes for copper quantification. South Africa-side team developed, characterized, and evaluated lab-scale filters from bio-waste and locally sourced clay, while Botswana-side team had advanced the impact assessment of mining activity on soil, water, plant ecosystem, and on food systems.

Official launching of the SusMine project started with a workshop at the Botswana International University of Science and Technology with the participation of all members of the Japan, South Africa, and Botswana teams. Representatives of all teams participated in interactive sessions with two local communities of Selebi-Phikwe (Kagiso Kgotla and Botshabelo Kgotla) to discuss the aim of the project and the expected impact on their communities. Over 200 participants, including local authorities, participated in the meetings. The event was publicized in the mass media reports by Botswana Daily News, MmegiOnline, and PressReader in Botswana. In addition, an international research workshop was organized at Kyoto University which brought together over 90 scientists from Japan, Africa and other countries to discuss and present solutions for environmental problems facing metal mines.