



Towards sustainable management of georesources: the importance of Cooperation Projects to boost education on responsible and sustainable mining. The example of the SUGERE and GEODES projects.

Giovanna Antonella Dino¹, Susanna Mancini¹, Dolores Pereira², Manuela Lasagna¹, Francesca Gambino¹, Guido Prego³, Domingos Gonçalves⁴, Aida Jacinto⁵, Daud Jamal⁶, José Loite⁷, Hélio Nganhane⁸, Nelson Rodrigues⁹, and Pedro Dinis⁹

¹UNIVERSITA DEGLI STUDI DI TORINO, Earth Science Department, Torino, Italy (giovanna.dino@unito.it)

²UNIVERSIDAD DE SALAMANCA, Salamanca, Spain

³UNIVERSIDADE KATYAVALA BWILA, Benguela, Angola

⁴UNIVERSIDADE AGOSTINHO NETO, Luanda, Angola

⁵UNIVERSIDADE MANDUME YA NDEMUFAYO, Lubango, Angola

⁶UNIVERSIDADE EDUARDO MONDLANE, Maputo, Mozambique

⁷UNIVERSIDADE LURIO, Nampula City, Mozambique

⁸UNIVERSIDADE PUNGUE, Chimoio, Mozambique

⁹UNIVERSIDADE DE COIMBRA, Coimbra, Portugal

Sustainable and responsible management of geo-resources requires a rethinking and redesign of our production and consumption patterns. Awareness of the natural environment as a common good to be preserved, and knowledge of the close link between the natural environment and the socio-economic system are prerequisites for a profound change in human attitudes at both individual and societal levels. In this context, training and education of all actors involved in the management of geo-resources is an indispensable starting point for the acquisition of critical, ethical, and conscious thinking and the technical skills necessary to solve local problems and initiate sustainable development.

The present research focuses on two consequential ERASMUS+ projects: SUGERE and GEODES. Both had the common goal of the international standardization of Higher Education training and teaching in Earth Sciences and Mining Engineering.

SUGERE (Sustainable Sustainability and Wise Use of Geological Resources) was successfully completed in September 2023, involved 3 European universities (from Portugal, Spain, and Italy) and 6 non-European universities (from Mozambique, Cape Verde, and Angola). The objective was to enhance capacity building for the responsible and sustainable use of geological resources by supporting the didactic organization and standardization of 5 degree courses at Bachelor, Master and Doctorate levels in Earth Sciences and Mining Engineering. Both online and face-to-face training sessions were organized in European and African universities.

GEODES, started in June 2023, represents the continuation of the SUGERE project and involves a total of 9 partners. The same 3 European universities and 6 African institutions, formally attributing teaching and training roles to 2 universities that participated in SUGERE, already achieved a good standard in terms of infrastructures and have long teaching experience in the field of geosciences, and receiving 4 young institutions from less favored regions of Angola and Mozambique.

SUGERE and GEODES projects aim to strengthen the role of geosciences in the development of up-to-date strategies for the sustainable management of natural resources and to implement new collaborations thanks to an international network focused on local economic and social development and respect for the natural environment in the geological-mining context. The culture of sustainability and the deepening of skills in the field of geological mining form the basis for the development of the critical thinking necessary for local problem solving, the acquisition of ethical values and the technical skills that underpin sustainable development.

Deepening technical skills in geomining from a sustainable perspective is crucial for developing critical thinking and acquiring ethical values necessary for solving local problems. SUGERE and GEODES contribute to this outcome with a solid network of research, training, sharing and exchange of expertise and research activities between European and non-European universities interested in mining issues. A careful analysis of the local economic development of the countries involved in the projects is required to achieve the most effective methods for the exploration and sustainable exploitation of underground georesources.