CO2 Storage Resource Assessment Project (CO2SRAP)

Dr. Yen Adams Sokama-Neuyam
Department of Petroleum Engineering, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

Project goals – Introduction

Ghana has set an ambitious target to deploy CCUS as part of its energy transition plans by 2040. Currently, the country does not have a reliable database of potential geological CO2 storage resources, which will serve as the basis to evaluate the feasibility and potential of the technology. The overall goal of the project is to identify, screen, score and rank geological storage facilities in Ghana in terms of their CO2 storage prospectivity to develop a preliminary CO2 Storage Resource Database for the country. Specific objectives of the project include:

1) To conduct qualitative assessment of the four existing sedimentary basins in Ghana to identify, screen, score and rank suitable geological storage facilities for CCUS using a machine learning-based multi-criteria screening framework
2) To conduct a quantitative assessment of the promising storage facilities to estimate the total storage capacity and the amount of CO2 the country can mitigate through CCUS under current conditions.

Methods

1) **Data Collection**: Stakeholders including the Petroleum Commission (PC) and GNPC shall be consulted to mobilize data on the four sedimentary basins.
2) **Screening and Ranking**: A machine learning-based multi-criteria framework shall be developed to screen, score and rank the storage facilities according to their CO2 storage prospectivity and eliminate those that do not meet the qualifying criteria.
3) **Storage Potential Estimation**: The storage potential of the promising storage facilities including the storage capacity, injectivity and containment efficiency shall be estimated. A preliminary CO2 storage resource database shall then be developed.
4) **Knowledge Gap Analysis**: Knowledge gap analysis shall be conducted to direct data mobilization towards a more robust assessment in the near future.
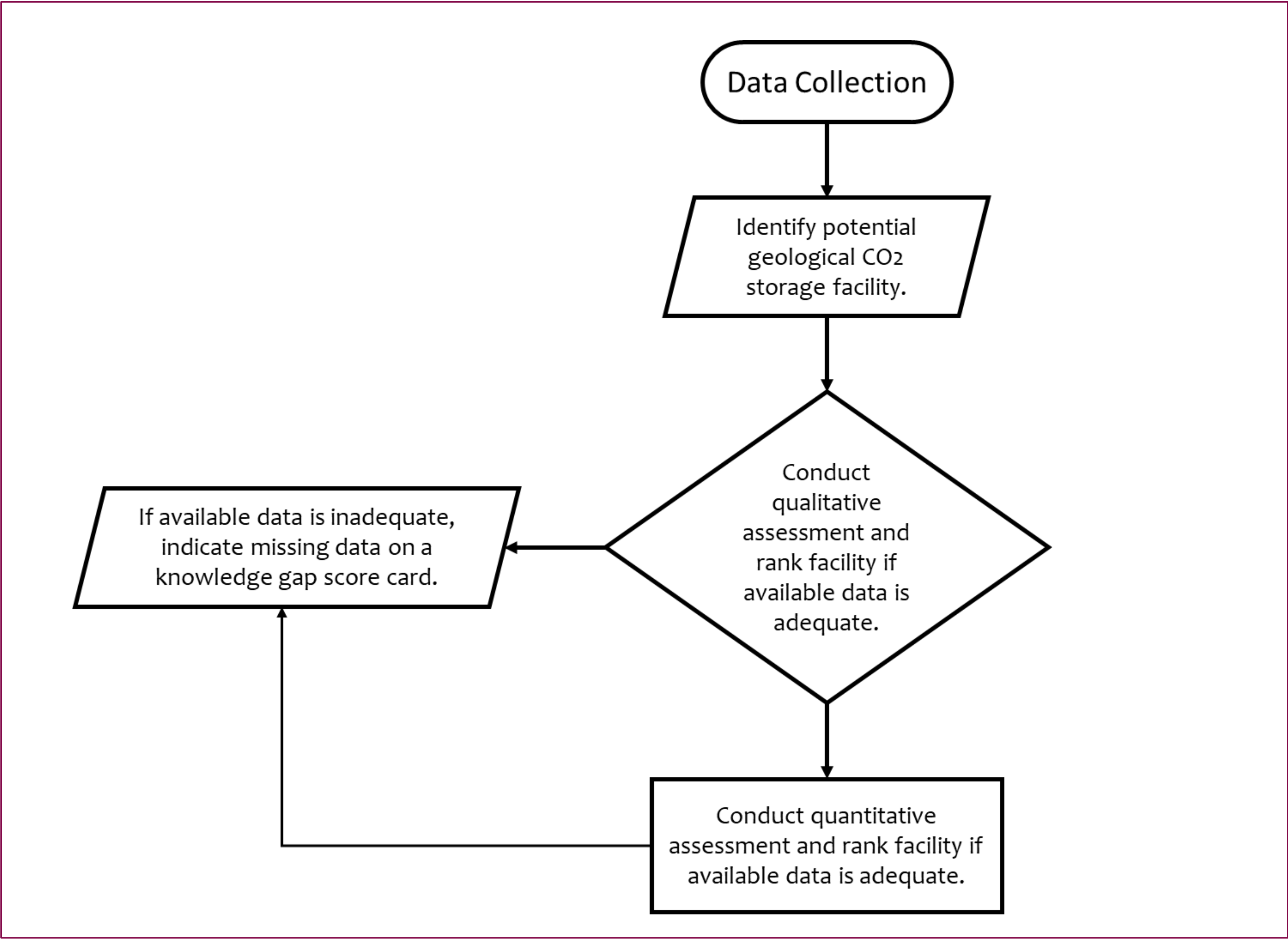
Results

Tremendous progress has been made over the past six months since the project funding was awarded.
- Regarding the first objective, we have successfully held two stakeholder meetings with the Petroleum Commission and GNPC to secure access to geological data for the project.
- For the second objective, the two research assistants hired under this project and I have successfully developed a machine learning-based screening criterion based on analogue field data to conduct the initial assessment of geological storage sites.
- A poster and a manuscript detailing this work have been produced, as attached. The manuscript has been successfully submitted for peer review and publication.
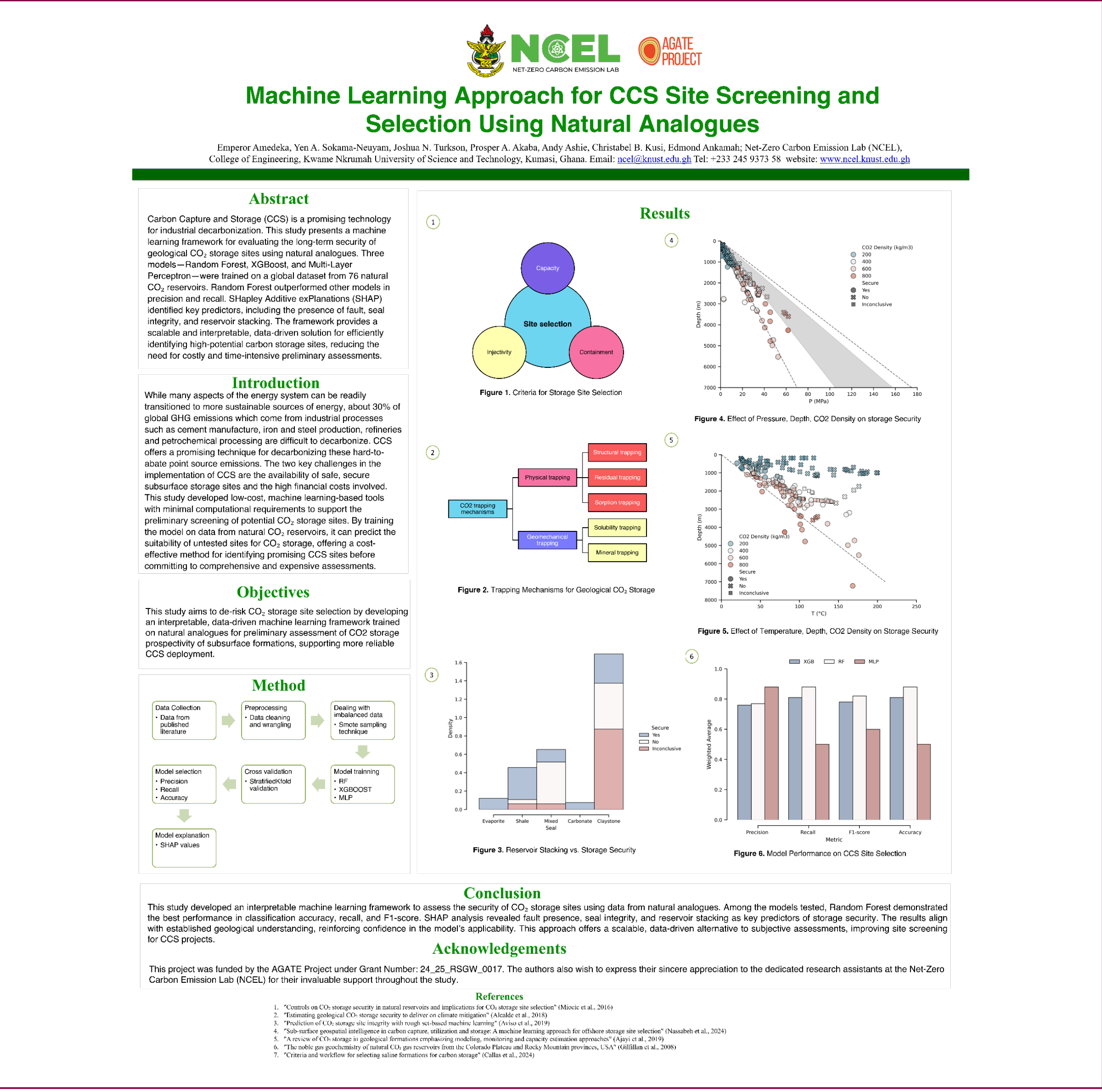
Discussion -Conclusions

Carbon Capture and Storage (CCS) is a critical component of the global energy transition, and Ghana has committed to deploying CCS by 2040 as part of its national energy transition agenda. However, the country currently lacks data on whether it possesses suitable geological storage sites for CO_2 and how much CO_2 can be effectively stored through CCS. Ghana has four major sedimentary basins, none of which have yet been assessed for their CO_2 storage potential. In November 2024, the CO_2 Storage Resource Assessment Project (CO_2SRAP) was awarded funding to conduct a preliminary evaluation of these basins using a machine learning-based approach. With the support of key stakeholders, including the Ghana National Petroleum Corporation (GNPC) and the Petroleum Commission, we have successfully secured access to critical geological data and developed a machine learning framework for screening storage potential. The next phase of the project will involve applying the model to the available data to assess the basins and reporting the findings to stakeholders to inform policy development and planning. We extend our sincere appreciation to the AGATE Project for their invaluable support. In addition to advancing national CCS readiness, the project has also contributed to local capacity building by training two research assistants in this emerging area of expertise.