

FY2020 Inter-University Exchange Project

Akita University and Kyushu University

Support for the Formation of Collaborative Programs with African Universities

[Name of project] (Year of Adoption: FY2020, (Type A②))

An innovative program for development of core human resources for smart mining to lead sustainable resource development in Southern Africa

[Summary of Inter-University Exchange Projects]

Resource Development in Southern Africa has Become More Challenging

Scope1. Deeper and Deeper

- ⇒ Ensure Safety
- Establish new Mining Method
- Automation/Unmanned Operation

Scope2. Lower Concentration

- ⇒ Explore Resources
- Evaluate Resources properly
- Development with Economic rationality
- Optimization of Management
- Automation/Autonomous

Scope3. Environmental (Regional) Friendly

- ⇒ Comprehend Mechanism of Pollution
- Propose Environmental Countermeasures
- Improve Recycling Technologies
- Energy Management

Integration of Humanities and Sciences!

- Technology Transfer and Education
- Understand Cultural Backgrounds
- Respect Policy and Mutual Understanding

"Good and Strong Relationships" has been established!

Expand

Staff: 25
Student: 40
Paper: 7

NEW EDUCATION PROGRAM (Inter-University Exchange Project)



Utilize AI, IoT and "Big Data" to Solve these Tasks!

[Summary of Exchange Program]

○ Program for Human Resource Collaborative Training of undergraduate and master's students in Japan and Southern Africa to train global experts in resource development implementation (Smart Mining) through Information Engineering with a focus on the core technology for Society 5.0 (such as AI, IoT, and Big Data, among others)

○ Online-driven program with COVID-19 pandemic taken into account

[Development of Global Human Resources]

Training of the global human resources skills listed below

- ① Practical skills based on advanced technical knowledge
- ② Ingenious technological development skills based on a solid foundation of Information Engineering to allow for a dimensional transition into the next stage of current resource development studies
- ③ Design and management capabilities with a panoramic view of the whole resource and environment system
- ④ Ability to negotiate between producer and consumer countries with a sense of balance that demonstrates a firm understanding of the positions of both parties

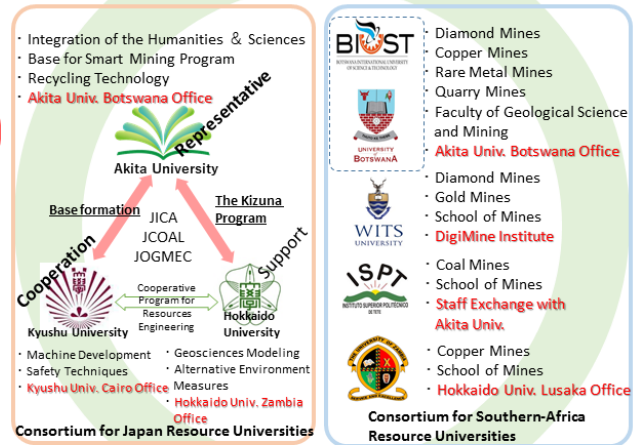
[Features of the project]

This collaborative program aims to train global human resources who will be able to implement and utilize Smart Mining techniques, one of Japan's strengths in the field of natural resources. As such, Japan strives to assume a leading role in developing abundant underground resources in Southern Africa. This program, as a part of this vision, consists of an interactive education and student exchange program. A certificate will be awarded to students who complete the program.

[Exchange number] (Total number)

		2020	2021	2022	2023	2024
Out bound	Students studying abroad		10	25	20	20
	Students taking online international education and exchange programs in their home countries	0	0	15	45	45
In bound	Students studying abroad		10	10	20	20
	Students taking online international education and exchange programs in their home countries	0	0	40	40	40

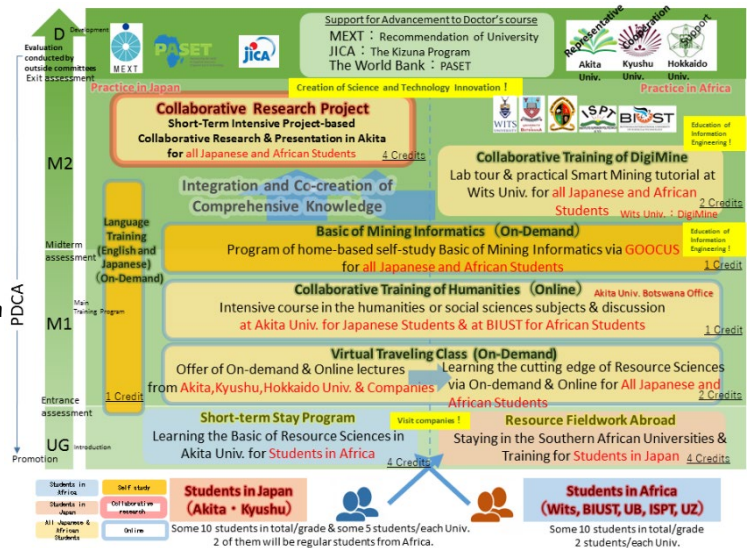
⇒ Offer of Japanese advanced resource technical research (Smart Mining) & education



⇒ Offer of Education and Research field for development of resources that doesn't exist in Japan

Consortium for Japan-Africa Resource Universities

Training of global human resources between Japan and Africa, who, using their combined knowledge of both past and present resource development and information engineering, will be able to implement new resource development technology in the coming decades (Smart Mining).

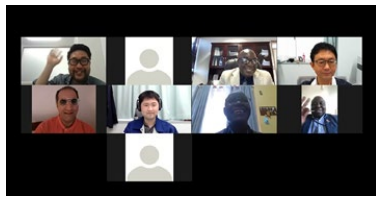


1. FY2020 Progress

【Name of project】(Adopted year: FY2020, (Type A)

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■ Exchange Programs



〈Management Committee meeting with Professors in Africa〉

Fiscal Year (FY) 2020, the first year of the project, was dedicated to preparation. A management committee meeting was convened in February to approve the establishment of the executive committee. Members of the domestic administrative agencies that are nominated as steering committee members (JICA, JOGMEC, and JCOAL) were selected based on the discussion, and a system to promote a more advanced program was implemented. In addition, progress in content and learning program creation was confirmed, members of the executive committee were approved, and a system for program implementation was established.

Student-Mobility

○ Outbound

Because FY2020 was a preparation year, no outbound students were dispatched abroad. Instead, the preparation of the implementation system and study contents proceeded with arrangements for online lectures, which were completed. Dispatching of outbound students is planned to commence during FY2021 if covid19 conditions are favorable.

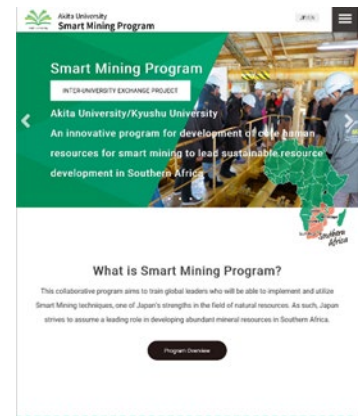
○ Inbound

Similarly, no inbound exchange students were accepted, and the contents mentioned above were prepared, with programs for inbound students scheduled to begin online in July 2021.

	2020	
	Plan	Results
Outbound	0	0
Inbound	0	0

■ Forming the University Network with Quality Assurance

The executive and steering committees, which assure educational quality, were set up through the establishment of implementation guidelines, selection of members for each committee, and formation of an executive and evaluative structure. The program contents were reviewed by the relevant Japanese and African universities, and a high level of learning contents was prepared through further discussion.



〈 Smart Mining Special Program HP〉

■ Promotion of Student-Mobility Environment

A content administration system, known as GOOCUS, was implemented as a tool for online learning, with creation of the necessary learning content and distribution environment proceeding. English-language materials such as a web page and brochure were prepared to promote the program to African students. To foster a deeper understanding of the program among the African students, the brochure also includes a description of the curriculum in addition to an overview. An appropriate environment for academic learning has been prepared through the support of JASSO.

■ Internationalization of the university, Information disclosure and Publication of outcome

A website and brochure were created to promote the program both domestically and internationally, and to recruit participants. In order to ensure that not only Japanese students are aware of the program, in addition to the Japanese-language website, an English site was also created to increase exposure of African students to the program.

■ Good Practices

While the program contains multiple units with travel components, considering the COVID-19 pandemic, all units have been proactively converted to an online format that will be conducted either live, on-demand, or on-demand self-study. Therefore, an online lecture infrastructure was prepared, the learning management system needed for the program was confirmed, and consideration was given to introducing GOOCUS for rigorous and transparent learning. Finally, development of the system was furthered by actual account issuance and system startup.

2. FY2021 Progress

【Name of project】(Adopted year: FY2020, (Type A)

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Exchange Programs

Physical and Chemical Properties of Copper

- Physical and Chemical properties of Copper are:

 - Name, Symbol: Copper, Cu
 - Atomic number: 29
 - Standard atomic weight: 63.55
 - Melting Point: 1085 °C
 - Boiling Point: 2562 °C
 - Density: 8.92 g/cc
 - Soft, malleable, and ductile
 - High electrical and thermal conductivity
 - Does not react with water



The undergraduate programs, Resource Fieldwork Abroad and the Short Stay Program were held online during FY2021. Ten students from Akita and Kyushu Universities joined the two-week Resource Fieldwork Abroad program provided by the University of the Witwatersrand in South Africa. Eleven undergraduates from Africa and one student from Kyushu University were selected to participate in Akita University's Short Stay Program.

〈Short Stay Program Presentation〉

	2021	
	Plan	Results
Outbound	10	10
Inbound	10	11

Student-Mobility

Outbound

Considering the spread of COVID-19 infections, students could not travel overseas; however, through the Resource Fieldwork Abroad, a total of ten students, six from Akita University and four from Kyushu University, participated in a two-week online course held by the University of the Witwatersrand.

Inbound

For the Akita University Short Stay program, a total of 12 students participated online, with two students each from the University of the Witwatersrand, The University of Zambia, Botswana International University of Science and Technology, and the University of Botswana. Additionally, three students from The Polytechnic institute of Tete, and one student from Kyushu University also participated.

Forming the University Network with Quality Assurance

The Executive Committee met once every three months to discuss and finalize the curriculum, course titles and contents, decisions related to the program implementation, and the results of the selection of students for the program. In May and July, the African Management Committee confirmed the program's implementation. Twice a year, the consortium members in Japan and Africa held a Management Committee meeting to approve decisions made by the Executive Committee and confirm the program's progress.

Promotion of Student-Mobility Environment

Same as the previous year, the learning management system "GOOCUS " was implemented for online learning. Furthermore, course guidelines with details of curriculum content was provided to all students.



〈GOOCUS learning page〉

Internationalization of the university, Information disclosure and Publication of outcome

At the International Conference on Material Engineering for Resources (ICMR), organized by The Society of Materials Engineering for Resources of Japan in October, a special session on smart mining was held, where three faculty members from three African partner universities and seven graduate students from Akita University presented their research and received comments from a wide range of researchers related to resources and materials.

Good Practices

The master's course lectures will begin in FY2022, and the relevant universities have approved the program contents, with fruitful discussions leading to enhanced learning content quality. The Executive Committee produced the contents for both the Resources Fieldwork Abroad and Short Stay Programs, recruited participating students, and successfully held both programs. The Committee further discussed curriculum content and implementation structure of the master's course lectures for the Smart Mining Special Program. The implementation structure for next academic year was also finalized, with the application guidelines and course guide being carefully designed and published online. Throughout this process, we ensured good communication with the African faculty members to promote mutual understanding. Therefore, a system to provide a series of lectures for the Smart Mining Special Program is ready to implement in FY2022.