

Republic of Indonesia

FY2023 Ex-Post Evaluation Report of
Japanese ODA Loan Project

“Hasanuddin University Engineering Faculty Development Project” and Technical Assistance
Project Related to ODA Loan “Project for the Capacity Building in Engineering, Science and
Technology (C-BEST) at Hasanuddin University in the Eastern Part of Indonesia”

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0. Summary

This project was implemented to enhance higher education and strengthen research activities in the field of engineering by development and expansion of the Faculty of Engineering (hereinafter referred to as “FoE”) at Hasanuddin University (hereinafter referred to as “UNHAS”) in South Sulawesi Province, Indonesia, thereby contributing to the development of industry in Indonesia, especially in the eastern part of the country, through the enhancement of engineering human resource development and research capacity. This project, which aimed to strengthen human resource development and research capacity in the field of engineering, is in line with Indonesia’s development policy and needs, and lessons learned from the past have been utilized. Regarding the consistency of the project, no projects were discussed and coordinated in advance with the intention of achieving specific results, but the project was consistent with Japan’s ODA policy. Therefore, its relevance and coherence are high. Although all outputs were achieved and the project cost was within the plan, the project period significantly exceeded the plan due to continued bidding failures. Therefore, efficiency of the project is moderately low. The quantitative effects of effectiveness regarding the improvement of educational and research capacity were achieved to a certain degree, and the qualitative effects were also achieved. The targets for quantitative effect indicators of impacts have been achieved except for some, and the positive impacts have been manifested, such as accreditation by international accreditation agencies and a breakthrough in university rankings. The increase in research opportunities for University-Industry-Government (hereinafter referred to as “U-I-G”) cooperation through the implementation of the Technical Assistance Project Related to ODA Loan (hereinafter referred to as “TA project”) contributed to the improvement of research quality and further enhancement of assessment from related institutions. Therefore, effectiveness and impacts of the project are high. Slight issues have been observed in the technical aspect. However, there are good prospects for improvement/resolution. Therefore, sustainability of the project effects is high.

In light of the above, this project is evaluated to be highly satisfactory.

1. Project Description



Project Location (source: prepared by evaluator based on JICA white map)



New campus of the FoE, UNHAS constructed under the project (Source: Project Completion Report)

1.1 Background

In Indonesia, there was a need to strengthen the competitiveness of its industries against the backdrop of intensifying competition with foreign imports and its increasing importance as an export base due to the progress of globalization, and a shortage of engineers and other human resources became a problem. In addition, there was a significant development gap between the western region centered on Java Island and the eastern region. The eastern region had industries, such as agriculture, fisheries, and marine resources, but had many underdeveloped areas, so development lagged behind. And there was an urgent need to develop human resources who could improve local processing capacity to increase added value in order to promote industrial development.

On the other hand, approximately 70% of Indonesia's national universities were concentrated in the western part of the country, and the gap in higher education between the western and eastern parts was also noticeable. UNHAS, located in Makassar City, South Sulawesi Province, is a national university established in 1956 and the largest university in Eastern Indonesia with 12 faculties and approximately 30,000 students. The FoE was established in 1960 and consisted of six departments (Architecture, Civil Engineering, Electrical Engineering, Mechanical Engineering, Naval Architecture Engineering, and Geological Engineering) with a total of 4,000 students. Most of the students were from the Eastern Indonesia region, and many of the graduates held key positions in local government agencies and regional industries. Thus, the FoE, UNHAS was a higher education institution that serves as a hub for the development of engineering human resources in Eastern Indonesia. However, it was unable to adequately meet the growing needs of education and research due to insufficient space for classrooms and experiments, obsolete equipment, and a lack of research equipment compared to the growing number of students.

Main Consultant(s) (Over 100 million yen)	PT. CAKRA MANGGILINGAN JAYA (Indonesia) / PT. DUTA HARI MURTHI (Indonesia) / INTEM CONSULTING INC (Japan) / Oriental Consultants Co., LTD. (Japan)
Related Studies (Feasibility Studies, etc.)	“Special Assistance for Project Formulation for Hasanuddin University Engineering Faculty Development Project” (hereinafter referred to as “SAPROF”) (2005 – 2006)
Related Projects	<p>ODA Loan Project</p> <p>- “Professional Human Resource Development Project (3)” (March 2006)</p> <p>Technical Cooperation Project</p> <p>- “Project for the Development of the Engineering Faculty of the Hasanuddin University” (TA Project) (2009 – 2012)</p>

[TA Project] “Technical Cooperation Project for the Capacity Building in Engineering, Science and Technology (C-BEST) at Hasanuddin University in the Eastern Part of Indonesia” (hereinafter referred to as the “TA Project”)

Overall Goal	Hasanuddin University (UNHAS) becomes a major base for university-industry-government (U-I-G) cooperation to create and develop local industry rooted in the Eastern Part of Indonesia (EPI).	
Project Purpose	The UIG cooperation activities and research activities in the Faculty of Engineering (FoE) at UNHAS are activated through Center of Technology (hereinafter referred to as "COT").	
Output(s)	Output 1	Management and operation system of COT is established.
	Output 2	COT is able to support U-I-G cooperation activities of FoE.
	Output 3	Research activities of the FoE are activated through U-I-G cooperation supported by COT.
Total cost (Japanese Side)	295 million yen	
Period of Cooperation	January 2015 – September 2020 (Extension Period: January 2020 – September 2020)	
Target Area	Eastern Part of Indonesia (EPI), including South Sulawesi Province	
Implementing Agency	FoE, UNHAS	

Other Relevant Agencies/ Organizations	None.
Organization in Japan	
Related Projects	None.

2. Outline of the Evaluation Study

2.1 External Evaluator

Mayumi Hamada, Foundation for Advanced Studies on International Development

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: August 2023 – January 2025

Duration of the Field Study: April 21, 2024 – May 10, 2024, August 4, 2024 – August 9, 2024

3. Results of the Evaluation (Overall Rating: A¹)

3.1 Relevance/Coherence (Rating: ③²)

3.1.1. Relevance (Rating: ③)

3.1.1.1 Consistency with the Development Plan of Indonesia

At the time of appraisal of the main project, Indonesia's *Long-term National Development Plan (RPJP: 2005–2025)* set forth the equitable distribution of development, and the *Medium-term National Development Plan (RPJM: 2004–2009)* set forth the strengthening of higher education institutions as a place to foster human resources in order to meet labor market needs and improve competitiveness through development in science and technology and other fields. The *Higher Education Long-Term Strategy (HELTS: 2003–2010)* and the *National Strategic Plan for Education (RENSTRA: 2005–2009)* called for strengthening educational facilities and equipment and promote fostering of teachers. At the time of the ex-post evaluation, the nine missions of the *RPJM: 2020–2024* included “establishment of a productive, independent, and competitive economic structure” and “equitable and just development. In addition, “human resource development” and “economic transformation” (transformation to an economy based on high value-added, modern, and competitive manufacturing and service sectors) were among the five main directives for achieving the mission. Therefore, the main body, which aims to strengthen engineering human resource development and research capacity, is consistent with Indonesian policy.

At the time of the planning of the TA Project, *RPJM: 2010–2014* recognized improving the

¹ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory.

² ④: Very High, ③: High, ②: Moderately Low, ①: Low.

quality of human resources with expertise in science and technology and creating jobs as development issues. At the time of project completion, *RENSTRA: 2020–2024* called for strengthening the relationship among higher education institutions, industry, and the government. Therefore, the project is highly consistent with the development policy.

3.1.1.2 Consistency with the Development Needs of Indonesia

In Indonesia, the shortage of engineers and other human resources was a problem amid a need to strengthen the competitiveness of its industries. In addition, there was a large development gap between the western region, centered on Java Island, and the eastern region. To promote industrial development, it was necessary to improve local processing capacity to increase added value; thus, the development of human resources to take charge of this was an urgent task. At the time of the ex-post evaluation, the shortage of technical personnel and a development gap remained between the western and eastern regions. In the eastern region, there is a particular need for infrastructure development, and engineering personnel are also needed for the plan to relocate its capital to Nusantara, which is under construction in East Kalimantan. There is a high need to produce engineering personnel in UNHAS, which has a large number of students from the eastern region.³ In light of the above, the main project, which aimed to foster engineering human resources and strengthen research capacity in the eastern region of Indonesia, and the TA Project, which aimed to strengthen ties among higher education institutions, industry, and the government, are in line with Indonesia's development needs.

3.1.1.3 Appropriateness of the Project Plan and Approach

At the time of appraisal of the main project, based on the lessons learned through the ex-post evaluation of similar projects, it was decided to review and strengthen the operation and maintenance management structure of the FoE, UNHAS to ensure efficient maintenance of facilities and equipment, as well as to support organizational strengthening through consulting services. In terms of the construction of the school building, it was planned to be designed and constructed from the perspective of universal design with consideration for the handicapped and so forth, and to take measures to prevent HIV/AIDS among construction site workers.⁴ All of these were implemented during the implementation phase of the main project. Support for strengthening organizational management led to the establishment of an operation and maintenance management system for facility construction and equipment at the new campus, as well as the effective and efficient use of the budget for facilities and equipment.⁵ Regarding universal design, all buildings were equipped with elevators and designed without steps, and

³ Questionnaire to UNHAS.

⁴ Ex-ante Evaluation Sheet of the main project pp. 3-4.

⁵ Questionnaire to UNHAS.

pedestrian decks were constructed to separate vehicles and pedestrians.⁶ In addition, training for construction site workers to prevent HIV/AIDS was implemented by a local NGO, which was commissioned to provide the training.⁷

At the time of planning the TA Project, based on the lessons learned from similar projects in the past, it was pointed out that it would be necessary to adjust/decide the annual number of dispatched faculty members considering lecturers who would take a leave of absence to study abroad, so it could be avoided that the remaining lecturers get increased burden due to a decrease in the number of lecturers who study abroad. It was also pointed out that those concerned with the projects should be aware of the need to hold joint seminars and to strengthen close cooperation among the counterpart offices, the COT Office, the Project Implementation Unit, and other related administrative offices to enhance the mutual effects between the TA project and the main project.⁸ During the implementation of the project, the number of lecturers dispatched annually was controlled to a certain degree.⁹ In addition, many of the lecturers who studied abroad completed their studies and returned to Indonesia before completion of the construction of the new campus, which was planned.¹⁰ Specifically, there was no adverse effect on education due to a shortage of lecturers as a result of lecturers studying abroad. This is because the old campus was smaller and had fewer students than the new campus, so, adapting a system in which other lecturers cover for the absence of lecturers who were studying abroad prevented adverse effects of a shortage of lecturers in terms of education. In addition, the idea of mutual help, such as covering for a colleague who is absent, has been common among the lecturers since before the project. Therefore, there was no problem for the lecturers to help each other in the absence of other lecturers.¹¹ On the other hand, activities to strengthen cooperation between the main project and the COT were not implemented very much.¹²

Therefore, there were no major problems with the project plan or approach.

3.1.2 Coherence (Rating: ②)

3.1.2.1 Consistency with Japan's ODA Policy

At the time of appraisal of the main project, Japan's *Country Assistance Plan for Indonesia* (2004) identified "assistance for the development of human resources for industry in higher education" as a priority area and priority item in order to "build a democratic and fair society." In addition, at the time of the planning of the TA Project, the *Country Assistance Plan for Indonesia* (2012) identified "support for correcting imbalances and building a safe society" and "support for

⁶ Interview with the implementation consultant, PCR Executive Summary, and observation by the evaluator during the site visit.

⁷ PCR Executive Summary p. 29, Interview with the implementation consultant.

⁸ Ex-ante Evaluation Sheet of TA Project p. 6.

⁹ Questionnaire to UNHAS.

¹⁰ Interview with UNHAS.

¹¹ Interview with UNHAS.

¹² Questionnaire to Japanese Expert.

further economic growth” as priority areas. And the “Higher Education Human Resource Development Program” including this project was positioned within these priority areas. Therefore, this project is highly consistent with Japan’s ODA policy at the time of planning.

3.1.2.2 Internal Coherence

No JICA projects were identified that were discussed or coordinated in advance with the intention of realizing specific effects to be gained through the collaboration at the time of appraisal and/or implementation.

3.1.2.3 External Coherence

No projects that were discussed and coordinated with other donors with the intention of producing specific effects at the time of appraisal and/or implementation were identified.

The main project was in line with Indonesia’s development policy and development needs from the time of appraisal to the time of ex-post evaluation, and the TA Project was also in line with them from the time of planning to the time of project completion. Lessons learned from the past were utilized, and no problems were found in the planning or approach. Although no projects were found to have been discussed and coordinated with the intention of producing specific effects regarding internal and external coherence, the projects were consistent with Japan’s ODA policy at the time of planning. Therefore, its relevance and coherence are high.

3.2 Efficiency (Rating: ②)

Because this ex-post evaluation is an integrated evaluation of the ODA Loan and the TA Project, efficiency was evaluated based on the outputs and inputs of the main project. Although the project period and project cost of the TA Project are not considered in the evaluation assessment, a comparison of its planned and actual periods and costs is indicated for reference.

3.2.1 Project Outputs

The outputs of the main project were as shown in Table 1. Each output was achieved as planned or better than planned.

Table 1: Status of Achievement of Outputs (Main Project)

	Planned	Actual
1	<p>Facility construction and basic infrastructure development</p> <ul style="list-style-type: none"> - Total floor space: 64,030 m² (including COT) - Education and research facilities: 52,590 m² - Common facilities: 11,440 m² <p>COT, library, computer center, basic laboratory building, workshop building, seminar meeting rooms, etc.</p>	<p>Facility construction and basic infrastructure development</p> <ul style="list-style-type: none"> - Total floor space: 73,421 m² (including COT) - Education and research facilities: 50,278 m² - Common facilities: 23,145 m² <p><u>Achieved.</u> [Major changes] Due to the increase in the number of departments (because of division of the departments), the classrooms which were initially intended to be at each department (Department Building) were changed to common ones for all departments (common classroom building) (no influence on the amount).</p>
2	<p>Equipment Procurement</p> <p>Approximately 1,000 items of equipment for educational and research activities. Assumed to be used for education and research activities of students and lecturers, as well as for joint and commissioned research with companies, and material analysis and measurement, etc.</p>	<p>Equipment Procurement</p> <p><u>Implemented as planned.</u></p>
3	<p>Fellowship and Research Program</p> <ul style="list-style-type: none"> - Graduate School Doctoral Program: 26 persons in Japan, 28 persons in Indonesia - Research Program (Japan): 28 persons (82 persons in total) <p>Implementation of study abroad/advanced study program for doctoral degree in Japan and Indonesia, and short-term research program (6 months) to conduct joint research at Japanese universities, etc., in order to improve lecturers' research capacity.</p>	<p>Fellowship and Research Program</p> <ul style="list-style-type: none"> - Graduate School Doctoral Program: 26 persons in Japan, 28 persons in Indonesia - Research Program (Japan): 73 persons (127 persons in total) <p><u>The Graduate School Doctoral Program was implemented as planned, and the Research Program significantly exceeded the plan.</u></p>
4	<p>Consulting Services</p> <ul style="list-style-type: none"> - Consulting Services A: Overall project management, detailed design, bidding assistance, construction supervision, etc. - Consulting Service B: Fellowship support (selection of a host institution for study and joint research, support for enrollment procedures, travel procedures, etc., monitoring during study abroad, and support for various payment procedures, etc.) 	<p>Consulting Services</p> <p><u>Implemented as planned.</u></p>

Sources: Ex-ante Evaluation Sheet, materials provided by JICA, PCR Executive Summary, Questionnaire to and Interview with UNHAS.

The two main changes from the plan were as follows:

(1) Increase in Floor Space

After the plan was formulated, the number of departments increased from 6 to 13 (division), and classrooms originally envisioned for each department were changed to a common classroom building for departments to improve efficiency. This resulted in an increase in floor space. The

common use of classrooms by departments has led to more efficient operation of the school building.¹³

(2) Duration and Number of Participants of Short-Term Research Program

The original plan was that 28 lecturers respectively stay in Japan for 6 months, but in 2015, the plan was changed to increase the number of students by reducing the dispatch period to 3 months. The reasons for this change were that an analysis of the initial dispatch situation during the implementation of the program revealed that it would be difficult to produce a thesis in 6 months as originally planned and it was reconfirmed that the main purpose of the program was to understand the Japanese laboratory-based education (hereinafter referred to as “LBE”) scene and establishing cooperative relationships with Japanese universities.¹⁴ At the same time, it was decided to send a faculty member who had obtained a doctoral degree from a university in Japan to a university other than that university and to send a faculty member who had obtained a doctoral degree in Japan or abroad through the fellowship program of this project to Japan in the research program. As sending lecturers who are fluent in English and understand Japanese culture to short-term research programs has led to the establishment of cooperative relationships with more universities, the change was appropriate.¹⁵



Photo 1: Pedestrian deck separating vehicles and pedestrians and connecting buildings
(Source: Photographed by the evaluator)



Photo 2: View from the pedestrian deck
(Source: Photographed by the evaluator)

¹³ Questionnaire to and Interview with UNHAS.

¹⁴ Questionnaire to and Interview with UNHAS.

¹⁵ PCR of Fellowship Service p. 12, Questionnaire to and Interview with UNHAS.



Photo 3: Inside the bright and clean department building (Source: Photographed by the evaluator)



Photo 4: Environmentally friendly design with natural light streaming in from the ceiling (Source: Photographed by the evaluator)



Photo 5: auditorium (Source: Photographed by the evaluator)



Photo 6: Inside the Library (Source: Photographed by the evaluator)

[Outputs of TA Project]

Table 2 shows the output achievement status of the TA Project. Outputs were achieved exceeding the plan.

Table 2: Status of Achievement of Outputs (TA Project)

Outputs	Achievement
1. Management and operation system of COT is established.	<u>Achieved as planned.</u> All three targets for indicators related to the establishment of operational management systems were achieved as planned.
2. COT is able to support U-I-G cooperation activities of the FoE.	<u>Achieved, significantly exceeding the plan.</u> All six targets for indicators showing COT support for U-I-G activities were achieved. In particular, the matching process, the number of contracts, and the number of inquiries all exceeded the plan significantly.
3. Research activities of the FoE are activated through U-I-G cooperation supported by COT.	<u>Achieved, significantly exceeding the plan.</u> The number of research proposals submitted to the Ministry of Research, Technology and Higher Education and the number of U-I-G collaboration research projects funded by provincial and district governments were both much higher than planned.

Source: PCR of the TA Project pp. 4-5.

Note: Based on the final version of the PDM.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The actual cost of the main project was 9,516 million yen (i.e., 83% of the planned amount of 11,491 million yen at the time of appraisal) within the plan. The actual ODA loan amount alone was 7,753 million yen (99% of the planned amount of 7,801 million yen), also within the planned amount. For details, please refer to the “Comparison of the Original and Actual Scope of the Project” on the last page of the report.

3.2.2.2 Project Period

At the time of appraisal, the planned period was from April 2007 to September 2013 (78 months), but the actual period was March 2007 to May 2019 (147 months) (188% of the plan), which significantly exceeded the plan (Table 3). This was mainly due to continuous bidding failures in the facilities construction, and procurement of equipment and furniture (Package 2) for the Department of Electrical and Mechanical Engineering.¹⁶

¹⁶ The reasons for bid failures was as follows: In the first-round bid opening, there were doubts about the quotation submitted by the best bidder. So, a reevaluation was conducted, and a decision was made to conduct a rebidding process. As the result of the rebid, when it was in the process of being approved by the Minister of Education, it was instructed to rebid again on the grounds that the procedures were not in accordance with the new Indonesia Procurement Ordinance, and a third bidding was implemented.

Table 3 Project Implementation Period (Main Project)

	Planned	Actual
Signing of L/A	April 2007	March 2007
Preparation of Bidding Documents	January 2008 – December 2008 (12 months)	April 2008 – November 2009 (20 months)
Bidding Period	January 2008 – January 2010 (25 months)	February 2009 – May 2017 (100 months)
Construction Work and Equipment Procurement	February 2010 – July 2012 (30 months)	June 2010 – May 2019 (108 months)
Fellowship and Research Program	April 2008 – September 2013 (66 months)	January 2008 – January 2016 (97 months)
L/A conclusion - Project completion	April 2007 – September 2013 (78 months)	March 2007 – May 2019 (147 months)

Source: Material provided by JICA, Ex-ante Evaluation Sheet, PCR.

Note: The starting point is the L/A signing, and the ending point is the completion of all construction, equipment installation, Fellowship and Research Program, and consulting services, as defined at the time of appraisal.

[Inputs for TA Project] (Reference)

In conducting an integrated evaluation of the main project and the TA Project, the project period and project cost of the TA Project are not reflected in the assessment of efficiency. The project's efficiency was analyzed based on the period and the cost of the main project. For reference, the actual cost of 295 million yen was compared to a planned cost of 320 million yen for the Japanese side of the TA project. The cost was well within the plan. The actual project period was 69 months, slightly longer than a planned 60 months. This was because the master's and doctoral program participants dispatched to Japan returned behind schedule.

3.2.3 Results of Calculations for Internal Rates of Return (Reference Only)

Given the nature of this project, the internal rate of return was not calculated at the time of appraisal and is not calculated at the time of ex-post evaluation.

As mentioned above, all outputs were achieved. On the other hand, regarding inputs, although the project cost was within the plan, the project period was much longer than planned due to continued bidding failures. Therefore, efficiency of the project is moderately low.

3.3 Effectiveness and Impacts¹⁷ (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

Regarding the quantitative effects of the main project, operational and effectiveness indicators and the achievement are shown in Table 4. At the time of appraisal, "Grade Point Average (GPA) of undergraduate students," "Number of years for undergraduate students to graduate," "Rate of graduates obtaining employment within 6 months after graduation," and "Number of faculty

¹⁷ When providing the sub-rating, Effectiveness and Impacts are to be considered together.

research papers published” were also included. However, because these are effects that are expected to emerge as a result of the effects shown in Table 4, they were evaluated under the impact section.

Table 4 Operation and Effect Indicators

Indicator (Unit)		Baseline Value (2005)	Target Value (2018)	Year 2019	Year 2020	Year 2021	Year 2022	Year 2023
Number of Students at the FoE (persons)	Bachelor (S1)	3,871	4,560	4,448	5,008	5,550	5,862	6,321
	Male			2900	3170	3566	3708	4076
	Female			1548	1838	1984	2154	2245
	Master (S2)	298	1,060	414	479	686	683	819
	Male			218	319	471	442	522
	Female			196	160	215	241	297
	Doctor (S3)	20	204	213	206	226	232	326
	Male			143	137	154	164	232
	Female			70	69	72	68	94
Lecturer–Student Ratio (Lecturers / Undergraduate Students)		1:13	1:10	1:19	1:19	1:23	1:24	1:27
Area of laboratory per student (m ²) (laboratory area/total student number)		1.9	6.6	3.9	3.4	3.0	2.9	2.6
Ratio of Lecturers with S2 & S3 Degrees (%)	Ratio	69	85	100	100	100	100	100
	Male			70.5	70.3	68.8	66.9	65.6
	Female			29.5	29.7	31.2	33.0	34.4

Source: Ex-ante Evaluation Sheet, Questionnaire to UNHAS.

Note: The percentage of lecturers holding master's and doctoral degrees by gender indicates the ratios of men and women to the total number.

Of the four indicators, the number of students increased significantly and exceeded all targets except for the master's program. UNHAS recognizes that this is the result of increased interest in

UNHAS at the undergraduate level, including students not only from Eastern Indonesia but also from Western Indonesia, as a result of the implementation of this project, although it was expected at the time of planning that the number of students in the master's program would increase more.¹⁸ The percentage of lecturers holding higher degrees has also exceeded the target and remained at 100% since 2019. On the other hand, the significant increase in the number of students has resulted in the "Lecturer–Student Ratio" and "Student–Laboratory Ratio" falling short of their targets. Although UNHAS has been making efforts to increase the number of lecturers to cope with the significant increase in the number of students, it has not been able to hire the required number of PhD holders, partly because it is difficult to find new graduates who want to become lecturers in Indonesia. However, at the time of the ex-post evaluation, it is assessed that the situation has not reached a serious level. Therefore, the quantitative effects of the main project have been achieved to a certain degree.

3.3.1.2 Qualitative Effects (Other Effects)

The qualitative effects expected at the time of appraisal were that the level of education and research improve, FoE, UNHAS serves as a base for formulating development policies and promoting industry in Eastern Indonesia, decentralization is promoted, the disparity between the eastern and western regions is corrected, and engineering education and research functions in Indonesia, especially in Eastern Indonesia, are promoted through enhanced collaboration with domestic universities.

Through this project, a total of 99 lecturers experienced and fully understood LBE in Japanese universities, and LBE has been practiced in all laboratories of the FoE of UNHAS since their return to Indonesia. In addition, the number of departments of the FoE, UNHAS, increased from six departments at the time of appraisal to 13; the number of programs increased significantly; and facilities and equipment were improved, so more diverse educational opportunities are available.

[The achievement of Project Purpose of TA Project]

Table 5 shows the achievement status of the Project Purpose at project completion. In addition, joint research activities between lecturers of the FoE and other domestic universities have increased as a result of implementing the TA Project. The level of achievement is high as all targets for indicators were achieved more than planned except for "sponsored research" (Indicator 1). The unachieved Indicator 1, "sponsored research," refers to funds from external sources such as industry, and there are many factors that cannot be controlled within the project compared to the other indicators. It is considered that the research fund was not provided sufficiently because the private sector had not grown enough. On the other hand, targets for indicators of joint research

¹⁸ Questionnaire to UNHAS.

and consulting services were achieved more than planned, contributing to an increase in the number of studies conducted by the FoE.

Table 5 Status of Achievement of Project Purpose
(TA Project Related at project completion)

Project Purpose: The U-I-G cooperation activities and research activities in the Faculty of Engineering (FoE) at UNHAS are activated through COT.			
Indicator	Target	Actual (cases)	Achievement
1: Following activities between COT (FoE) and the clients are implemented.			Mostly achieved
1-1: Sponsored research during project period	13	4	Not achieved
1-2: Joint research during project period	13	19	Achieved exceeding the plan
1-3: Consultancy Services during project period	20	198	Achieved exceeding the plan
1-4: Test and verification services	3 / year	16	Achieved exceeding the plan
1-5: Regular meeting with clients	Quarterly	18	Achieved
2: Research results of FoE are utilized by clients during project period.	At least 3	16	Achieved exceeding the plan

Source: Prepared based on PCR of TA Project.

Note: Based on the final version of the PDM. In order to facilitate comparison with actual results, the target values of the indicators are organized in a separate column.

3.3.2 Impacts

3.3.2.1 Intended Impacts

Four indicators that were considered operational and effectiveness indicators at the time of appraisal were evaluated as quantitative effectiveness indicators of impact for the reasons stated in the effectiveness section. The target and actual values for these indicators and their performance are shown in Table 6.

Table 6 Quantitative Effects of Impacts

Indicator (Unit)	Baseline Value (Year 2005)	Target Value (Year 2018)	Year 2018	Year 2019	Year 2020	Year 2021	Year 2022	Year 2023
Grade Point Average (GPA) of undergraduate students (points) (S1)	3.04	3.3	3.1	3.2	3.2	3.3	3.4	3.6
No. of years for undergraduate students to graduate (years) (S1)	5.2	4.5	4.8	4.6	4.5	4.3	4.2	4.1
Rate of graduates obtaining employment within 6 months after graduation (%)	70	100	67.6	61.1	53.3	86.6	58.6	68.8

Average number of research papers for publication (per person annually)	0.7	1 and above	1.09	1.16	1.12	1.18	1.19	1.19
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Source: Ex-ante Evaluation Sheet p. 3, Questionnaire to UNHAS

Note: GPA is based on absolute evaluation.¹⁹

Three of the four targets for indicators have been achieved: higher GPA, shorter graduation years, and higher number of faculty research papers published, all of which can be attributed to the results of this project, such as improvement of education and research facilities and equipment through this project, the experience of lecturers in obtaining doctoral degrees and participating in the research fellows program, the establishment and continuation of cooperative relationships with Japanese universities where they studied abroad, and the improvement of students' active attitudes and creativity through the introduction of LBEs. The only indicator that was not achieved was the "waiting time for the first job less than 6 months after graduation," which fell far short of the target. Because the employment rate is greatly affected by the financial performances of companies who are potential employers of graduates, it can be inferred that in Eastern Indonesia, where industry is not fully developed, the rate was affected by external factors unrelated to changes in students' abilities. Therefore, the achievement level of the quantitative effects of impacts is relatively high.

3.3.2.2 Other Positive and Negative Impacts

1) Impacts on the Environment

At the time of appraisal, this project was classified as Category B based on the *Japan Bank for International Cooperation Guidelines for the Confirmation of Environmental and Social Considerations* (April 2002), as it was determined that this project did not fall under sectors, characteristics, and areas that are likely to be affected as listed in the guidelines, and that adverse impacts on the environment would not be significant; thus, it was classified as Category B. Additionally, although the project was to be implemented on the site of an existing old paper mill, and the negative impact on the natural environment was expected to be minimal, slate corrugated sheets containing asbestos (non-friable asbestos) were used in the walls and roof materials. Therefore, before the project implementation, it was planned to dismantle them in a wet state and dispose of them properly as industrial waste in accordance with the domestic laws of the country.

In response to the above, UNHAS prepared an Environmental Impact Assessment (EIA) report for this project, as well as an environment management plan (RKL) and an environmental monitoring plan (RPL), which were approved by BAPEDALDA (Local Environmental Impact Management Agency) in March 2008. Although the RPL and EIA reports were not available, it is

¹⁹ Interview with Lecturer, UNHAS.

inferred from interviews with the implementing agency that appropriate environmental consideration was made. Specifically, asbestos was removed in accordance with the method agreed upon with the Minutes of Discussion (MoD) during the demolition of the old paper mill building on the project site. Additionally, appropriate measures were taken during the facility construction work, and no negative impacts on nearby residents due to noise and vibration were observed. According to the monitoring report, no negative environmental impacts were observed during the project implementation.

2) Resettlement and Land Acquisition

The project was planned to entail the acquisition of approximately 38 ha of land, and the acquisition procedures were to be carried out in accordance with the national law of the country, with no resettlement planned. The transfer of land rights and payments (twice in total) were completed according to the plan and reported to JICA,²⁰ the Directorate General of Higher Education of the Ministry of Research, Technology and Higher Education, and BAPPENAS,²¹ with no problems observed.

3) Gender; 4) Marginalized People; and 5) Social Systems and Norms, People's Well-being and Human Rights

Barrier-free access was considered in the design of the facility construction. According to the interview with a student with disabilities (there was only one student with disability who was enrolled in the master's program), the elevator and ramp make it easy to move around, and there are no problems with toilets. The floor is not slippery, which is also a relief for students with disabilities who need a cane because it prevents them from falling.

6) Unintended Positive / Negative Impacts

As for other impacts, in terms of education, the introduction of LBE in all laboratories of the FoE has resulted in a change in students' responses, and some lecturers commented that they are more active and creative than before the project was implemented. Although detailed data on the employment after graduation were not available, a follow-up survey conducted in 2023 showed that 60.37% of the new graduates were employed in Eastern Indonesia.²² In addition, it is also a positive impact that many of the lecturers who received their doctoral degrees through the fellowship program under the project have been promoted after returning to Indonesia.

In terms of research, the number of research projects in the FoE has also increased significantly compared to that before the implementation of the project. In particular, the number of research

²⁰ At the time of planning and the beginning of this project, it was JBIC, but JBIC merged with JICA in 2008. The name after the merger is JICA.

²¹ PCR Executive Summary pp.25-28.

²² Questionnaire to UNHAS.

projects using external funds has increased significantly compared to that before the implementation of the project (Table 7). In addition, the number of papers published in international journals and the number of research collaborations with foreign institutions have also increased. Furthermore, the FoE of UNHAS has not only promoted the development of railroad transportation and the use of solar panels in South Sulawesi Province but also established a Nickel Research Center to meet the needs of industry and is participating in the promotion of research related to nickel mining of raw materials. Another noteworthy change is that companies that previously approached universities in Java are now also approaching the FoE of UNHAS for research.²³

Table 7 The Number of Research Conducted at FoE, UNHAS

(Unit: cases)

	2005	2007	2019	2020	2021	2022	2023
Number of Research Conducted with Internal Fund	23	46	67	38	39	47	30
Number of Research Conducted with External Fund	5	34	136	111	131	100	71
Total	28	80	203	149	170	147	101

Source: UNHAS.

Furthermore, the FoE, UNHAS, whose facilities and equipment have been improved by this project, has been active to receive national and international accreditation as an institution of higher education. As a result, FoE, UNHAS has already received accreditation from the Accreditation Agency for Study Programmes in Engineering, Informatics, Natural Sciences and Mathematics (ASIIN), the Indonesia Accreditation Board for Engineering Education (IABEE), Accreditation Board for Engineering and Technology (ABET), and other international accreditors. These increased its credibility as an institution of higher education. In addition, improvement in university rankings is also remarkable. The FoE of UNHAS was ranked 8th in Indonesia in the Times Higher Education World University Rankings (THE WUR) for the first time in 2023, and the Department of Civil Engineering was ranked 8th in Indonesia in THE WUR. In addition, the Department of Civil Engineering was ranked No. 1 in the engineering sector in Indonesia in the 2021 SCImago Institutions Rankings (SIR) university rankings.²⁴ It can be inferred that such international accreditation as an institution of higher education and high ranking in the university rankings have improved its reputation among outsiders and drawn more attention of them to FoE, UNHAS, leading to an increase in the number of applicants for admission.

²³ Interview with UNHAS.

²⁴ Questionnaire to UNHAS.

[Impacts of the TA Project]

Table 8 shows the indicators for and the achievement status of the Overall Goal of the TA Project: “UNHAS becomes a major base for U-I-G cooperation to create and develop local industry rooted in the Eastern Part of Indonesia” at the time of ex-post evaluation. Among the four indicators, the utilization of research results was achieved, exceeding the plan. However, patent applications and prototype production did not achieve the target, and no data were available for entrepreneurship. Therefore, the Overall Goal of the TA Project was partially achieved.

Table 8 Status of Achievement of Overall Goal
TA Project

Indicator		Achievement			
		2020	2021	2022	2023
1	13 research results utilized for development of industries/government/communities (cases)	73	102	73	53
	(1) Industry	13	18	11	9
	(2) Government	53	68	49	39
	(3) Communities	7	16	13	5
2	5 entrepreneurs who have started own business using output of COT activities (groups)	NA	NA	NA	NA
3	Patents applied/approved through research conducted by COT (Applied: 13, Approved: 2)	/			
	(1) Applied: 13	1	3	3	4
	(2) Approved: 2	0	0	0	1
4	3 proto-type productions	1	1	0	0

Source: Questionnaire to COT.

Note: The values for 2020 show that after October 2020 when the project was completed.

According to interviews with local governments, universities and other institutions of higher education, and companies²⁵ that have commissioned research to COT, the level of credibility in the COT/FoE, UNHAS and the assessment on the results of the commissioned research is extremely high. The contributing factors to this mentioned included the good working relationship between the researchers and the administration staff within the COT and between the COT and the FoE, UNHAS.²⁶ In addition, at the time of the ex-post evaluation, the abovementioned local companies and local government officials visited by the evaluator highly assessed the FoE of UNHAS as a “hub of U-I-G cooperation in Eastern Indonesia.” However, information on changes in recognition of the FoE before and after the project could not be obtained because it was difficult to look for respondents who knew the situation both before the project implementation and at the time of the ex-post evaluation.

Regarding effectiveness, the quantitative effects of the main project were achieved to a certain

²⁵ Two for each category, six organizations in total.

²⁶ Questionnaire to COT.

degree, and the qualitative effects were also achieved. In addition, it can be inferred that the implementation of the TA Project has increased opportunities for research commissioned by local governments, other universities, and companies, as well as contributed to strengthened research capacity. Therefore, the effectiveness of the project is high. Regarding impacts, the targets for indicators of the main project's impacts were achieved except for the employment rate. The nonachievement of the employment rate is considered to be largely due to the influence of external socioeconomic factors. In addition, some other positive impacts were manifested, such as accreditation by several international accreditation agencies, higher rankings in university rankings, and promotions of fellowship and research program participants. Furthermore, promotion of the U-I-G cooperation activities by the COT of TA Project has increased the level of trust in the FoE by making the local government, other universities, and companies aware of the problem-solving abilities of lecturers at FoE, UNHAS through their research. Thus, the impacts are high.

Thus, this project has mostly achieved its objectives. Therefore, effectiveness and impacts of the project are high.

3.4 Sustainability (Rating: ③)

3.4.1 Policy and System

As previously mentioned in the relevance section, this project, which aimed to enhance education and research in engineering field and to reduce their regional disparities, is consistent with *RPJM: 2020–2024*. In addition, *RPJM: 2020–2024* states the importance of U-I-G cooperation activities to enhance national competitiveness. Thus, the sustainability in policy aspects of the project is high.

3.4.2 Institutional/Organizational Aspect

Through this project, a new maintenance management structure was established at the new campus. A maintenance manager is assigned under the dean and vice dean of the FoE, and staff and technicians are assigned under the maintenance manager. In addition, a person responsible for maintenance management has been appointed from each of the 13 departments in the FoE. Table 9 shows the changes in the number of operation and maintenance personnel in the FoE. According to the FoE, maintenance is performed regularly according to the procedure manual, and there is no shortage in the number of maintenance personnel.²⁷ As for the COT, a total of 11 personnel, including engineers and technicians, have been consistently assigned from the start of the TA Project to the time of ex-post evaluation. Therefore, no problems are observed concerning sustainability from institutional/organization aspect.

²⁷ Questionnaire to and Interview with UNHAS.

Table 9: Number of Operation and Maintenance Personnel in the FoE

(Unit: persons)

	2014	2018	2019	2020	2021	2022	2023	2024
Operation and maintenance manager	1	1	1	1	1	1	1	1
Engineer	3	13	13	13	13	13	13	13
Technician	20	10	10	10	10	10	10	10
Secretary	1	1	1	1	1	1	1	1
Zone Manager	-	13	13	13	13	13	13	13

Source: Questionnaire to UNHAS

3.4.3 Technical Aspect

The retention rate at the time of the post-evaluation was 100% for the 127 lecturers dispatched in and out of Indonesia under the Fellowship and Research Programs. The participants of Fellowship and Research Program in Japan were able to seamlessly continue their research after returning to Indonesia using the same equipment as they utilized in Japan, so there were no problems. They have also maintained a good relationship with their Japanese university supervisors, with whom they can consult as needed after returning to Indonesia.²⁸

The equipment installed under this project is generally well maintained and utilized for education and research. Only the pieces of equipment in Table 10 were not functioning at the time of ex-post evaluation, but half of them have been taken care in some way, and requests of support for the remaining two (which are too expensive to be repaired by the faculty) have been submitted to the university, awaiting responses. However, the FoE at UNHAS has the largest number of students among all the faculties, and it puts part of its tuition fees paid into its own fund. The FoE expects that it is highly likely that the university will approve the repair costs, but in the unlikely event that this does not happen, the FoE plans to use its own funds for the repairs.²⁹ Therefore, there is a high likelihood that the problem will be resolved in the future.

Table 10: Equipment Not in Operation at the Time of Ex-Post Evaluation

No.	Name of Department	Name of Equipment	Problem	(Expected) Cost	Countermeasure
1	Naval Architecture Engineering	Towing Tank 4M Educational Towing Carriage	The simulation software is not functioning.	Approximately IDR 550,000,000 (including invitation cost of exerts from UK)	(Incomplete) Currently applying from FoE to University
2	Geology	Scanning Electromagnetic Microscope 450	The software is not functioning.	Approximately IDR 500,000,000	(Incomplete) Currently applying from FoE to University

²⁸ Questionnaire to and Interview with UNHAS.

²⁹ Dean, FoE.

3	Mining Engineering	Caloric Meter LECO AC500	It is not functioning.	Approximately IDR 20,000,000	(Currently being underway) Repairs have been requested to a contractor. Waiting for repairer.
4	Architecture	Plotter Machine	A part of equipment became necessary to be replaced, but it was expensive.	Amount unknown.	(Action completed) A new machine was procured by the department as it was cheaper to buy a new one than fix it.

Source: Questionnaire to and Interview with FoE, UNHAS, and Direct Observation at the site.



Photo 7: Towing Tank (Source: Photographed by the evaluator)



Photo 8: Scanning Electromagnetic Microscope (Source: Photographed by the evaluator)

3.4.4 Financial Aspect

Table 11 shows the financial situation of the FoE, UNHAS. The FoE of UNHAS has been consistently in the black, with increases in both revenue and expenditure from the beginning of the project to the time of ex-post evaluation. The revenue of the FoE as an educational institution comes from academic fees from students. As mentioned before, the FoE has the largest number of students in UNHAS, and a part of the academic fee is pooled and utilized as the funds owned by the FoE. The funds are basically used for the students of the FoE, which has already constructed a student building and is constructing a sports facility at the time of the ex-post evaluation. Construction of a cafeteria building is planned in the future.

Table 11: Financial Situation of FoE, UNHAS

(Unit: Million Indonesian Rupiah)

	2007	2018	2019	2020	2021	2022	2023
Revenue	16,185	31,479	38,060	53,559	58,302	66,569	70,237
Expenditure	16,105	31,216	37,866	53,433	58,189	66,373	70,099
Balance	79	263	194	125	113	196	138

Source: Prepared based on Questionnaire to UNHAS.

Note: Some calculations may not add up as the values are rounded to the nearest million Indonesian Rupiah.

The maintenance costs of the UNHAS Engineering Department are shown in Table 12. They have been increasing almost continuously since the beginning of the project, and no particular problems have been observed.

Table 12: Maintenance Expenses of the FoE, UNHAS

(Unit: Million Indonesian Rupiah)

	2018	2019	2020	2021	2022	2023	2024
Revenue	850	2,684	2,664	3,749	4,081	4,660	4,917
Expenditure	725	2,618	2,600	3,674	3,945	4,632	4,899
Balance	125	66	64	75	136	28	18

Source: UNHAS Questionnaire Responses.

Note: Figures for FY2024 are estimates.

Table 13 shows the amount of research grants from external sources. Although there have been slight increases and decreases, there has been a general trend of increase since the project completion.

Table 13: Externally Funded Research Outsourced to FoE, UNHAS

(Unit: Million Indonesian Rupiah)

	2007	2018	2019	2020	2021	2022	2023
Commissioned research funds	6,695	41,859	44,112	34,066	36,055	40,710	22,586

Source: Questionnaire to UNHAS.

Based on the above, there are no financial problems.

3.4.5 Environmental and Social Aspect

As previously mentioned in the “Environmental Impacts” section, there were no negative environmental impacts from the project. There is no factor for concern that negative impacts will occur in the future.

3.4.6 Preventative Measures to Risks

No particular problems were observed.

3.4.7 Status of Operation and Maintenance

As stated before, the equipment in each laboratory is generally functioning well. Some of the nonfunctioning equipment has already been addressed or is likely to be resolved in the future.

As stated above, slight issues have been observed in the technical aspect; however, there are good prospects for improvement/resolution. Therefore, sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project was implemented to enhance higher education and strengthen research activities in the field of engineering by development and expansion of the FoE at UNHAS in South Sulawesi Province, Indonesia, thereby contributing to the development of industry in Indonesia, especially in the eastern part of the country, through the enhancement of engineering human resource development and research capacity. This project, which aimed to strengthen human resource development and research capacity in the field of engineering, is in line with Indonesia's development policy and needs, and lessons learned from the past have been utilized. Regarding the consistency of the project, no projects were discussed and coordinated in advance with the intention of achieving specific results, but the project was consistent with Japan's ODA policy. Therefore, its relevance and coherence are high. Although all outputs were achieved and the project cost was within the plan, the project period significantly exceeded the plan due to continued bidding failures. Therefore, efficiency of the project is moderately low. The quantitative effects of effectiveness regarding the improvement of educational and research capacity were achieved to a certain degree, and the qualitative effects were also achieved. The targets for quantitative effect indicators of impact have been achieved except for some, and the positive impact has been manifested, such as accreditation by international accreditation agencies and a breakthrough in university rankings. The increase in research opportunities for U-I-G cooperation through the implementation of the TA Project contributed to the improvement of research quality and further enhancement of assessment by related institutions. Therefore, effectiveness and impacts of the project are high. Slight issues have been observed in the technical aspect. However, there are good prospects for improvement/resolution. Therefore, sustainability of the project effects is high.

In light of the above, this project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

(1) Equipment

UNHAS is recommended to grant the FoE's request on the repair cost of equipment as much as possible. The FoE is also recommended to request UNHAS to take an immediate response to the above request of two pieces of equipment and, in the unlikely event that it is not granted, to promptly repair the equipment with the FoE's own fund.

(2) Lecturer-Student Ratio and Securing Lectures

Although an increase in the number of students in the FoE is desirable, a further worsening of the lecturer-student ratio could lead to a decline in the quality of education. FoE, UNHAS is recommended to make every effort to secure a sufficient number of lecturers for improving the lecturer-student ratio.

4.2.2 Recommendations to JICA

It is recommended that the JICA Indonesia Office monitors the transition of the lecturer-student ratio of FoE, UNHAS and U-I-G cooperation activities by COT and, if necessary, share the monitoring results with the JICA headquarters, give advice to UNHAS, or consider providing necessary support.

0.2 Lessons Learned

Timing of University Facilities and Equipment Development and Fellowship/Research Program for Lecturers

The project included development of facility construction and equipment as well as implementation of the Fellowship/Research Program for lecturers at FoE. For their doctoral degrees, 127 lecturers studied at Japanese/Indonesian universities or stayed in Japan for research, with no major problems with the education of their students. This was largely due to the fact that the project developed a plan to almost complete the study abroad and research programs before the construction of facilities and equipment was completed. As a result, any negative impact on education for students was avoided by having lecturers help each other, which might have been difficult if it was before the move to the new campus and the increase in the number of acceptable students. In addition, the lecturers who returned from Japan were able to use the equipment they were familiar with in Japan at the new campus, allowing them to resume their research activities seamlessly. In this way, when the construction of a new university campus and the program of studying abroad for the degrees of lecturers are carried out under the same project, it would be beneficial to develop an overall plan so that they can complete their study abroad before construction of new campus is completed.

5. Non-Score Criteria

5.1 Performance

5.1.1 Objective Perspective

According to the FoE, UNHAS, the implementing consultant contributed to the construction of a high-quality facility with excellent quality control, problem-solving, and communication skills. The JICA experts of TA Project significantly contributed to networking with Japanese and Indonesian universities as well as industries in Indonesia with his knowledge. In addition, the JICA Indonesia Office staff regularly visited UNHAS to monitor the progress of the project from the preparatory stage to the completion of the project and acted as a liaison with central ministry and so on, which was beneficial to UNHAS.

5.2 Additionality

None.

(End)

Comparison of the Original and Actual Scopes of the Project

Item	Plan	Actual
1. Project Outputs	1) Facility construction and basic infrastructure development 2) Procurement of equipment 3) Fellowship and Research Program (Doctorate Degree Program and Research Program in Japan and Indonesia) 4) Consulting Service (A: Overall Project Management, Detailed Planning, Support for Bidding, Construction Management, etc., B: Support for Fellowship Program)	1) As planned 2) As planned 3) As planned 4) As planned
2. Project Period	April 2007-September 2013 (78 months)	March 2007-May 2019 (147 months)
3. Project Cost		
Amount Paid in Foreign Currency	4,954 million yen	3,568 million yen
Amount Paid in Local Currency	6,535 million yen (527,016 million Rupiah)	5,948 million yen (683,705 million Rupiah)
Total	11,491 million yen	9,516 million yen
ODA Loan Portion	7,801 million yen	7,753 million yen
Exchange Rate	1USD = 115.88 yen 1USD = 9,368 Rupiah 1 Rupiah = 0.0124 yen (As of September 2006)	1USD = 100.77 yen 1USD = 11,511 Rupiah 1 Rupiah = 0.0087 yen (Average between March 2008 and July 2019)
4. Final Disbursement	July 2019	