

People's Republic of China

FY2017 Ex-Post Evaluation of Japanese ODA Loan Project

“Higher Education Project (Liaoning Province)”

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0. Summary

This project aimed at improving education and research at 15 universities in Liaoning Province by improving facilities and equipment as well as training teachers. The project was highly relevant and performed according to the higher education human resource policies of China and Liaoning Province. Furthermore, it aligned with China's and Liaoning Province's development needs for quantitative and qualitative expansion of education at universities and Japan's ODA policy. Therefore, relevance is high. In terms of effectiveness, increases and improvements were evident for many indicators related to quantitative and qualitative improvement. It was also confirmed that the project contributed to obtaining approval for founding new graduate schools and key disciplines or laboratories, and improved education, research conditions, and the environment. In terms of impacts, the universities involved in the project demonstrated substantial improvements compared to the pre-project period for indicators such as employment rate, number of award-winning research papers, number of patented research outcomes, and number of published research papers. In addition, in terms of contributions to regional revitalization, strengthening of market rules, and environmental conservation, the development of human resources in related fields at participating universities became more robust, and various initiatives are making progress through both commissioned and research projects. There are also many examples of how cooperation and mutual understanding has been fostered between Chinese and Japanese universities. As such, the effectiveness/impact is high as outcomes were produced mostly as planned. Because the project cost was slightly higher and the project period significantly lasted longer than planned, the efficiency is low. No major problems have been observed in the institutional, technical and financial aspects of the operation and maintenance, as well as in the status of the operation and maintenance.

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

1 . Project Description



Project location



The International Education College building of Liaoning Shifua University

1 . 1 Background

In China, the reform and open policy has since 1978 brought about the transition to a market economy, rapid economic development, and associated environmental problems. This became even truer with China's accession to the World Trade Organization (WTO). Against this background, it was becoming necessary to strengthen education and research activities related to market rules and environmental problems. In addition, as regional economic disparities had become visible, it required regional revitalization to fill the gap. In response to these demands as well as increasing demand for the higher education, it became necessary to quantitatively and qualitatively improve higher education. To address this, the Chinese government set the following goals in its *10th Five-Year Plan for National Economic and Social Development (2001-2005)*: a 15% enrollment rate in higher education institutions (HEIs); enrollment of 16 million students in HEIs; and development of human resources in fields such as law, finance, and trade.

Liaoning Province, located in northeastern China, has an area of 146,000 km², and a population of 41.2 million people (2004). The per capita GDP of Liaoning Province was 16,298 yuan (2004), higher than the national average of 10,561 yuan, but much lower than the coastal province average of 27,802 yuan. In addition, because the revenue of Shenyang City and Dalian City, which accounted for approximately half (56%) the province's total GDP, was on a self-paying basis, the revenue of both these cities was excluded from the province's budget. Therefore, these funds cannot be used for provincial educational expenses such as the operating expenses of provincial universities including those participating in this project, creating a shortage of revenue that can be allocated to higher education expenses across the province.

In terms of educational level, although Liaoning Province's 2004 higher education

enrollment rate of 29.3% was high compared to the national average of 19%, the province lagged behind in terms of the amount of educational and research equipment, and particularly the school building area provided. Furthermore, Liaoning Province had numerous state-owned enterprises, and the unemployment rate became severe when many went bankrupt consequent to the effects of reform and open policy, creating an urgent need to develop human resources to work toward regional revitalization in Liaoning Province.

1.2 Project Outline

The objective of this project is to quantitatively and qualitatively improve higher education in Liaoning Province by providing 15 target universities with “hard” (improvement of school buildings and equipment) and “soft” (conducting training for faculty) support, thereby contributing to developing human resources who could work toward strengthening market rules, environmental conservation, and regional revitalization in Liaoning Province.

(Participating universities¹) Liaoning University, China Medical University, Shenyang University of Technology, Liaoning Technical University, Shenyang Agricultural University, Dalian Medical University, Dalian Jiaotong University, Dalian Polytechnic University, University of Science and Technology Liaoning, Shenyang University of Chemical Technology, Liaoning Shihua University, Dongbei University of Finance and Economics, Liaoning Normal University, Shenyang Normal University, and Liaoning University of Technology (15 universities in total)

Loan Approved Amount/ Disbursed Amount	5,775 million yen / 5,650 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	June 2006 / June 2006
Terms and Conditions	<p>Interest Rate 1.5% (0.75% for training component)</p> <p>Repayment Period 30 years (40 years for training component)</p> <p>(Grace Period 10 years)</p> <p>Conditions for procurement General untied</p>
Borrower /	The Government of the People’s Republic of China/

¹ The university names are those used at the time of the ex-post evaluation. (Among the 15 universities, four have changed their names since the appraisal period.)

Executing Agency (ies)	Liaoning Provincial People's Government
Project Completion	December 2015
Main Contractor(s) (Over 1 billion yen)	—
Main Consultant(s) (Over 100 million yen)	—
Related Studies (Feasibility Studies, etc.)	<ul style="list-style-type: none"> - F/S by Liaoning Construction Consultancy Company, 2005 - “Special Assistance for Project Implementation (SAPI) for Higher Education Project in China”, Japan International Cooperation Agency (JICA), 2003, 2004 and 2005 - “The Supervision Survey Report on JICA Loaned Higher Education Project”, JICA, 2010
Related Projects	<ul style="list-style-type: none"> - ODA Loan: “Higher Education Project (Hebei Province)” (June 2006) - ODA Loan: “Higher Education Project (Hainan Province)” (June 2006)

2. Outline of the Evaluation Study

2.1 External Evaluators

Toshihiro Nishino/Ayako Nomoto (International Development Center of Japan Inc.)

2.2 Duration of Evaluation Study

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

Duration of the Study: August 2017-November 2018

Duration of the Field Study: December 3, 2017-December 16, 2017 and May 13, 2018-May 18, 2018

3. Results of the Evaluation (Rating: B²)

3.1 Relevance (Rating: ③³)

3.1.1 Consistency with the Development Plan of China

The objective of this project has been consistent with the development plans of China, including the five-year plans at the national and provincial level, five-year plans in the

² A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

³ ③: High, ②: Fair, ①: Low

education sector, and other education-related strategies both during the appraisal and the ex-post evaluation. They stated that they “aim to develop advanced human resources that meet societal needs by quantitatively and qualitatively improving higher education with the goal of achieving social and economic development and correcting issues of regional disparities.” Although there have been no major policy changes at the appraisal stage or ex-post evaluation stage, *the Thirteenth Five-Year Plan (2016–2020)* presents a policy of “building world-class universities and disciplines (promoting the building of leading universities and disciplines), while gradually increasing world-class university and academic fields.”

Table 1 Primary Targets for Development Plans Related to the Project

Type	During Appraisal	During ex-post evaluation
National Development Plan	<u>Tenth Five-Year Plan for National Economic and Social Development (2001–2005)</u> <ul style="list-style-type: none"> • Increase the rate of enrollment in HEIs (students enrolled/school-age [18–22] population) to around 15%. • Improve educational conditions: Primarily expand the scope of education at the higher education stage in large and medium cities, and enhance the quality of education. 	<u>Thirteenth Five-Year Plan for Economic and Social Development (2016–2020)</u> <ul style="list-style-type: none"> • Continue to promote vocational education, university reform, improvement of capabilities of human resource development, educational equality, and educational reform. • The numerical target for higher education is an enrollment rate in university education of 90% or higher.
National Educational Development Plan	<u>Tenth Five-Year Plan for Education (Educational Plan 10-5) (2001–2005)</u> <ul style="list-style-type: none"> • Numerical target: Increase the number of enrolled students at HEIs to 16 million by 2005 and 23 million by 2010. • Response to adjustments in industrial structure: Develop human resources who have advanced skills related to high-tech work, biotechnology, and manufacturing technology, and develop human resources who are advanced in fields like law, finance, and trade to be compatible with membership in the WTO. 	<u>Thirteenth Five-Year Plan for Education (2016–2020) and National Plan for Medium and Long-term Education Reform and Development (2010–2020)</u> <ul style="list-style-type: none"> • Promote “the building of leading universities and disciplines” and “improvements in the cultivation of core/key universities in midwestern China⁴.” • Increase the rate of enrollment at HEIs from 26.5% (2010) to 40% (2020).

⁴ Although Liaoning Province is not normally included in the midwestern part, it is a participating region in such projects constructing higher education institutions in the midwestern part as a part of the Project for the Promotion of Higher Education in the Midwestern Part.

Provincial-level Development Plan	<u>Tenth Five-Year Plan (2001–2005) for Education in Liaoning Province and 2010 Long-term Provincial Plan</u> <ul style="list-style-type: none"> • In the area of university education, improve the conditions for school operation, strive to improve the capabilities of teachers, and streamline school expansion and establishment of specialties. Furthermore, bring university standards up to those of leading universities by improving the standards of education and scientific research. • Aim for the following targets. Student population size: 1.1 million in 2010; rate of enrollment in higher education: 33% in 2005, 38% in 2010. 	<u>Thirteenth Five-Year Plan (2016–2020) for Education in Liaoning Province, Thirteenth Provincial Five-Year Plan (2016–2020)</u> <ul style="list-style-type: none"> • “Build approximately ten top-class, distinctive disciplines across the country,” “raise the employment rate of people with bachelor’s degrees to 92%,” “increase the abilities of universities to make scientific and technological reforms,” etc. • “Continue to prioritize the development of human resources such as those who are advanced in management/technology,” “increase investment in scientific and technological fields,” etc.
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Source: Documents provided by JICA, texts of each plan

3.1.2 Consistency with Development Needs of China

At the time both of the appraisal and ex-post evaluation, the needs for quantitative and qualitative expansion of education at the 15 participating universities were recognized.

At the time of the appraisal, higher educational needs in Liaoning Province were expected to grow, and the filling the gap of economic disparities with other coastal provinces described in “1.1 Background” was needed. The number of enrolled students at HEIs in Liaoning Province was 213,000 in 2004, and a 2012 demand forecast estimated it would increase to 788,000 people. Although the central government had called for universities to make improvements to hard (expansion of school buildings and equipment) and soft (teacher training) areas to meet these growing needs, there were financial limitations.

At the time of ex-post evaluation, strong needs to develop human resources for regional revitalization, strengthening market rules, and environmental conservation remained. Liaoning Province is highly dependent on state-owned enterprises in its economy and industries, and has a low rate of economic growth compared to the national average. This can be attributed to factors such as the slow reform of state-owned enterprises and slow structural transition from heavy industries, giving it a particularly high level of needs in these areas. These issues were raised in *the 13th Five-Year Plan for Liaoning Province*. As (i) *the 12th Five-Year Plan for Liaoning Province* demonstrated achievements in the quantitative expansion of higher education and (ii) an increasing need for developing human resources that emphasize the quality

of graduate-level education consequent to the influence of improved economic and industrial standards in China, plans are being made to shift the emphasis of policies from quantitative expansion to quality improvement. This is represented by “promoting the building of leading universities and disciplines.” This project aligns with the province’s needs from the perspective of improving educational quality.

3.1.3 Consistency with Japan’s ODA Policy

At the time of the appraisal, the project was highly consistent with Japan’s ODA policy. The fundamental principles of *the Japan’s ODA Charter* emphasized support to Asian regions and in the field of human resource development, which was consistent with the project.

Furthermore, at the time of the appraisal, *the Economic Cooperation Program for China (FY2001)*, *the Medium-Term Strategy for Overseas Economic Cooperation Operations (FY2005–FY2007)*, and *the Country Assistance Strategy (FY2005)* supported China’s policies of the open and reform. Furthermore, from the perspective of dealing with adjustments in economic structure after China joined the WTO, they emphasized the development of human resources, thus the project was consistent with these strategies. The *Country Assistance Strategy* included regional revitalization and interaction, strengthening market rules, and environmental conservation as key areas for human resource development.

As described above, this project has been highly relevant to China’s development plan and development needs, as well as Japan’s ODA policy. Therefore, its relevance is high.

3.2 Efficiency (Rating: ①)

3.2.1 Project Outputs

The extent to which project outputs were achieved is as described in the “Comparison of the Original and Actual Scope of the Project” at the end of this report. In terms of hard outputs, Dongbei University of Finance and Economics and Shenyang Normal University used their own funds to construct a library and school building respectively, because they needed construction to take place early. At the Liaoning Shihua University, plans for construction using Japanese ODA Loan funds changed from focusing on a school building to a building for the International Education College, which comprises international student dorms and classrooms for international students (primarily international students from Asia and Africa) (no changes were made to the construction area). Because Dongbei University of Finance and Economics and Shenyang Normal University used their own funds to construct a library and school building, the

construction area funded by the Japanese ODA Loan funds decreased dramatically (The funds for construction were diverted to procuring equipment).

Furthermore, in terms of school building construction, Liaoning Shihua University was expected to “utilize the building to conduct joint research with Japan,” but that objective has not been achieved because of the change in construction plans. Changes to the construction plans were made to accommodate changes in university needs, and no major issues related to the project output of school building construction were observed. In addition, as a result of the steadily increasing number of international students, primarily from Africa and Asia, hard project outputs are being used either as planned or more than planned.

Table 2 Actual Results of School Building Construction

	Plan	Actual	Content of changes
Liaoning Shihua University	11,000 m ²	19,000 m ²	Changed from school building to building for the International Education College
Dongbei University of Finance and Economics	17,000 m ²	-	Excluded from the project: Self-funded construction of library
Shenyang Normal University	10,000 m ²	-	Excluded from the project: Self-funded construction of school buildings
Total	38,000 m ²	19,000 m ²	

Source: Documents provided by JICA, questionnaire responses and interviews from executing agency/participating universities

In terms of improvement of educational equipment, procurement was split into multiple packages during this project. Furthermore, because of the long period of procurement⁵, there were frequent cancellations of and slight changes or adjustments to equipment based on (i) changes to equipment specifications and (ii) changing needs at the respective universities⁶. Despite this, delivery mostly followed the initial plans and installation was completed according to the plan.

Regarding soft outputs, the actual total number of university instructors who received training in Japan, were accepted as trainees, experts, or participated in joint research

⁵ Although the contract for standard university procurement packages (product-based packages) was formulated in 2009, because three years had already passed since the initial plans were developed from 2005 to 2006, and urgently needed equipment had been already installed, some adjustments were made to the specifications of equipment and devices. In addition, subsequent installations focusing on individual university procurement packages (university-based package) primarily occurred from 2014 on, and adjustments were made to accommodate equipment that had already been installed using a university’s own funds during that period.

⁶ The funds saved because of the result of bidding and those from canceled packages in the initial procurement packages were allocated to later packages within the ODA Loan approved amount after following formal procedures.

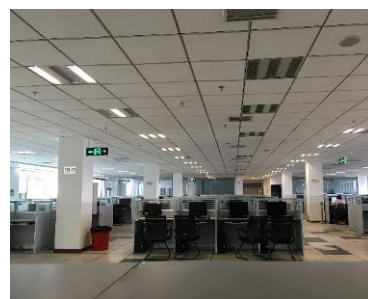
was about 10% higher than planned. While training results were significantly higher than planned, there were zero results for joint research and expert acceptance, much lower than planned. According to interviews with people affiliated with the participating universities, there were no results for joint research and expert acceptance because (i) many universities thought that training in Japan was more effective from a human resource development standpoint; (ii) expert acceptance and joint research could be achieved using budgets from other projects, making it more logical to use funds from this project for training; and (iii) for universities with little interacting with Japanese universities, it was difficult to conduct joint research or be accepted as an expert.



A confocal laser microscope provided to Dalian Medical University has a dedicated experimenter assigned to it and a high rate of use.



A nuclear magnetic resonance device provided to Shenyang University of Chemical Technology. One of the most cutting-edge pieces of equipment in the province, with many analysis requests coming from outside the university.



PCs set up in the library of Shenyang Agricultural University. These are frequently used by students.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total project cost slightly exceeded that planned (114% of the planned cost). The higher cost is attributed to the following aspects. (i) Because extreme depreciation of the yen continued from 2013 and shortfalls were covered using local currency, project costs increased (exchange rate: at the time of appraisal, 1 yuan = 13.7 yen, average of 14.9 yen over the entire period, 12.6 yen in 2012, and 19.4 yen in 2015). (ii) Costs increased after equipment specifications changed from those in the initial plan. In particular, the actual cost of educational equipment in local currency was 4,628 million yen, a significant increase from the 1,611 million yen planned. Furthermore, the actual cost of training was approximately 135% of the planned cost, because the results of sending personnel for training exceeded that planned, and the expense of sending personnel for training after 2013 increased

because of the depreciating yen.

Table 3 Planned and Actual Project Costs

(Unit: million yen)

	Planned (appraisal)						Result					
	Foreign currency		Local currency		Total		Foreign currency		Local currency		Total	
		ODA loan		ODA loan		ODA loan		ODA loan		ODA loan		ODA loan
School building construction	299	299	1,361	0	1,660	299	110	110	87	0	197	110
Provision of educational equipment	4,949	4,949	1,611	0	6,560	4,949	5,300	5,300	4,628	0	9,928	5,300
Training, etc.	297	297	11	0	308	297	240	240	175	0	415	240
Tax	0	0	55	0	55	0	0	0	0	0	0	0
General administrative expenses, etc.	0	0	47	0	47	0	0	0	65	0	65	0
Price escalation	172	172	0	0	172	172	0	0	0	0	0	0
Contingency	299	58	149	0	448	58	0	0	0	0	0	0
Total	6,016	5,775	3,234	0	9,250	5,775	5,650	5,650	4,955	0	10,605	5,650

Source: Compiled from documents provided by JICA and the executing agency

Note: 1) Exchange rate was 1 yuan = 13.7 in planned amounts and 1 yuan = 14.9 yen in actual amounts (2006–2015 average). 2) Because no information was obtained regarding actual interest during construction, they are excluded from both the planned and actual figures. 3) There is no information regarding a breakdown of local and foreign currencies for actual ODA loan amounts. Local currency refers to domestic funds in China.

3.2.2.2 Project Period

The actual project period was 115 months, a significant increase from the planned project period of 58 months (198% of the planned period). The reasons for exceeding the planned project period are described below.

1) Procedures were time-consuming, because the complexity of the various procedures to procure educational equipment necessitated corrections of paperwork.

2) After the project started, procurement proceeded based on standard packages that followed the Department of Education of Liaoning Province's policy of creating procurement packages common among universities, and adjustment among universities was time-consuming because of the large number of universities

participating⁷. Furthermore, procedural delays at some universities affected overall progress.

3) In addition to in-country procedures that became time-consuming due to making corrections to equipment specifications, procurement procedures were also delayed because of the processing of bidder complaints regarding the bidding results.

4) Because the Department of Education of the province and universities lacked experience in sending personnel overseas for training as part of an international cooperation project, preparation for long-term specialized training of university teachers and in-country procedures were especially time-consuming.

5) For the construction of school buildings, procurement plans needed to be adjusted because of increases in material costs, requiring more time for in-country procedures.

Table 4 Planned and Actual Project Period

	Planned (appraisal)	Result
Signing of loan agreement	June 2006	June 2006
School building construction	July 2006–April 2009	March 2011–September 2014
Procurement of educational equipment	July 2006–April 2008	October 2006–December 2015
Training, etc.	October 2006–March 2011	October 2007–October 2015
Project completion (project period)	March 2011 (58 months)	December 2015 (115 months)

Source: Compiled from documents provided by JICA, documents provided by executing agency, and responses from executing agency

3.2.3 Results of Calculations for Internal Rate of Return (Reference only)

Since the Internal Rate of Return (IRR) was not calculated at the time of appraisal, IRR was not calculated in the ex-post evaluation either.

Thus, the project cost slightly exceeded the plan and the project period significantly exceeded the plan. Therefore, efficiency of the project is low.

3.3 Effectiveness and Impacts⁸ (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

⁷ According to the Provincial Department of Education, procedures for government procurement in Liaoning province were simplified in 2018. In particular, the procurement of imported equipment was changed to a university-led system.

⁸ Sub-rating for Effectiveness is to be put with consideration of Impacts.

The operation and effect indicators established at the time of the appraisal and indicators measuring other quantitative effects all nearly attained target values or showed a pattern of improvement. Thus, the expected effects are produced. When this project was being implemented, various similar projects were being conducted by the province and participating universities, and improvements of indicators will likely be attributable to the combined effects of project development that include these projects. Among these projects, contributions by the ODA loan were offered through a framework unrelated to public financial support mainly by the central government for all universities (ODA loan does not affect the amount of normal university support). The ODA loan greatly contributed to the overall improvement of school buildings and educational equipment at participating universities. In particular, at the start of the project, all universities lacked funding for the construction of school buildings and purchasing of equipment, therefore, these funds were valuable. As this report subsequently describes, the construction and equipment provided by this project made certain contributions that raised schools to university status and ensured the approval of key departments and laboratories, contributing to promoting improvement of school buildings and educational equipment at participating universities.

(1) Quantitative improvement in education/research

The number of students enrolled at participating universities (in 2016, one year after project completion) increased by approximately 35,000 compared to the appraisal stage. (However, result data could only be obtained from 13 universities of the 15 planned.) The target value was missed by approximately 90,000 people (when considering the 2 universities from which data could not be obtained, the shortfall is estimated at about 50,000 people). The target was not met, because (i) the Provincial Department of Education adopted quota restriction policies for universities, ahead of other provinces, based on anticipating future decreases in the province's youth population, and (ii) recent national policies have been pushing for the independence of academies affiliated with universities. Accordingly, the number of students at the majority of participating universities peaked between 2014 and 2015, after which student numbers in all decreased.

The school building area of participating universities significantly increased at all universities. Although the amount of data that could be obtained from universities was limited (13 universities), the actual school building area in 2016 was more than 2.9 million m² compared to actual numbers in 2004, nearly doubling over the 12-year period.

Table 5 Number of Students Enrolled (Total of Graduate Students, Undergraduate Students, Special-Course Students) and School Building Area (Classrooms, Laboratories, Libraries, Gymnasiums, Lecture Halls) (Total of Participating Universities)

	Baseline	Target	Actual	Actual
	2004	2012	2012	2016
		1 Year after Project Completion	Initial Planned Year of Completion	1 Year after Project Completion
Number of enrolled students (10,000 students)	21.3	33.9	24.9	24.8
(Simple single-school average)	1.42 (15 schools)	2.26 (15 schools)	2.08 (12 schools)	1.91 (13 schools)
School building area (1,000 m ²)	3,325 (15 schools)	5,828 (15 schools)	4,686 (11 schools)	6,235 (13 schools)

Source: Documents provided by JICA, questionnaire responses from universities

The total amount of educational/research equipment at participating universities rose significantly, although both a baseline and actual value could not be obtained for some universities. Although target values were not set for the total amount of educational/research equipment, a simple average of universities from which data could be obtained indicates an increase from 71.51 million yuan in 2004 to 190.56 million yuan in 2012 and 290.72 million yuan in 2016. This rate of growth is high, even compared to that of the number of enrolled students or school building area. This high growth rate has continued as of the ex-post evaluation.

Table 6 Total Amount of Educational/Research Equipment (Total of Participating Universities)

	Baseline	Actual	
	2004	2012	2016
		Initial Planned Year of Completion	1 Year after Project Completion
Total amount of educational/research equipment (10,000 yuan)	71,507	228,674	348,872
(Simple single-school average)	7,151 (10 schools)	19,056 (12 schools)	29,072 (12 schools)

Source: Questionnaire responses from universities

The equipment installed by the project has been used well, and responses from each school indicated a utilization rate for main equipment of about 95–100%. Furthermore, site surveys of each school confirmed that the equipment have been used.

(2) Qualitative improvement in education/research

Table 7 shows the status of school building area per student and amount of educational/research equipment per student, indicators set at the time of appraisal to demonstrate qualitative improvement in education and research.

The school building area and amount of educational/research equipment per student at participating universities improved significantly at all universities, because the increase in the school building area and amount of educational/research equipment exceeded the student population. As a result, almost all universities are at a level that exceeds national standards⁹.

Table 7 School Building Area/Amount of Educational Equipment per Student

	Baseline	Target	Actual	
	2004	2012	2012	2016
			Initial Planned Year of Completion	1 Year after Project Completion
School building area per student (m ² /person)	16.1 (15 schools)	16.5 (15 schools)	21.4 (11 schools)	23.3 (13 schools)
Amount of educational/research equipment per student (yuan/person)	5,326 (15 schools)	6,455 (15 schools)	8,064 (11 schools)	13,333 (12 schools)

Source: Documents provided by JICA, questionnaire responses from universities, etc.

Note: 1) Figures are simple average of participating universities. 2) Based on calculation methods from the appraisal, special-course/undergraduate students were converted as one student and graduate students as two students for the calculation.

The status of improvements in major educational and research indicators are as shown in Table 8.

First, this report examines indicators for which target values were set at the time of appraisal. Although a simple comparison was not possible because responses regarding actual values could not be obtained from all 15 universities for which baseline values and target values were set, the average number of master's degree programs at the universities exceeded the target value as of 2012. On the other hand, the number of doctorate degree programs and key disciplines (state level and provincial/ministerial level¹⁰) did not attain the target value and have not changed compared to the baseline value in 2004. According to the executing agency and universities, the primary reason the target value for number of key disciplines was

⁹ National standards (for ordinary university departments) differ according to department, as described below. School building area per student: 9 m² for medical studies (minimum) and 22 m² for social sciences (maximum). Amount of educational equipment per student: 3,000 yuan for social sciences (minimum) to 5,000 yuan for scientific disciplines such as engineering, agriculture, and medical studies (maximum).

¹⁰ Those designated by a provincial government or ministry, such as the Ministry of Education, are classified as "provincial/ministerial level" while those designated by the state are classified as "state level".

not attained was that policies by the national and provincial governments restricted the designated number of key disciplines and granted almost no new approvals in recent years.

The number of key laboratories, undergraduate disciplines, and research projects have been trending upward from the 2004 results, except for the number of state-level laboratories, for which national and provincial governments restricted the designated number, same as the case of key disciplines. In particular, the number of research projects demonstrated immense growth in the 2016 results, increasing four to six times compared to 2004.

As described, although some indicators were not achieved because of restrictive government policies and some indicators showed little actual growth, other indicators demonstrated improvements or increases. To obtain approval for key disciplines, key laboratories and research project (state/provincial/ministerial level), keeping hard aspects (school buildings and educational equipment) above a certain standard is essential. The hard outputs produced by this project made important contributions to this end.

Table 8 Changes in Main Educational/Research Indicators
(Total of Participating Universities)

	Baseline	Target	Actual	Actual
	2004	2012	2012	2016
		1 Year after Project Completion	Initial Planned Year of Completion	1 Year after Project Completion
Number of key disciplines (state level)	9	51	6	6
Number of key disciplines (provincial/ministerial)	76	182	84	88
Number of key laboratories (state level)	7	-	2	4
Number of key laboratories (provincial/ministerial)	62	-	77	109
Number of undergraduate faculties/departments	266	-	527	599
Number of master's degree programs	488	946	680	704
Number of doctorate degree programs	153	274	139	154
Number of research projects (state level)	48	-	294	298
Number of research projects (provincial/ministerial)	321	-	1,363	1,526

Source: Documents provided by JICA, questionnaire responses from universities, etc.

Note: 1) Indicators for which no target value was set at the time of appraisal were also added to the performance indicators. 2) The target value is the total value for the 15 universities. 3) Baseline values (2004)

are the total value from 15 universities for the following indicators with target values set during the appraisal: number of key disciplines, number of key laboratories, number of master's degree programs, and number of doctorate degree programs. The baseline values for the other indicators are the respective total values from 7 of the 15 universities that responded regarding the number of undergraduate faculties/departments, 9 universities regarding the number of research projects at the state level, and 8 universities regarding research projects at the provincial/ministerial level. 4) Of the 15 universities, 12 provided the actual values for the number of key disciplines and key laboratories; 10 for the number of undergraduate faculties/departments, master's degree programs, and research projects; and 11 for the number of doctorate degree programs.

3.3.1.2 Qualitative Effects (Other Effects)

Interviews with executing agency and universities and a literature review confirmed the information described in Table 9 regarding the following primary qualitative effects of hard aspect: contributions to the establishment of new graduate schools and acquisition of approval for key disciplines and laboratories; improvements in education, research conditions, and the environment; and recruitment of human resources.

Table 9 Effects in Hard Aspect

<p><u>Contributions to the establishment of new graduate schools and acquisition of approval for key disciplines and laboratories:</u> The improved status of school buildings and educational equipment is an important indicator for approval for graduate schools, particularly the establishment of doctorate degree programs and key disciplines and laboratories. In many instances, the hard outputs provided by this project have contributed to these ends.</p> <p>[Example 1] The project contributed to universities being designated to the National High School Basic Ability Construction Project of Western and Central China, which promotes higher education in the western and central regions (five universities in Liaoning Province were designated, four of which were participating in this project).</p> <p>[Example 2] Utilizing a noise measurement device, one university applied to the Vital Science Platform of Liaoning Province (a research institution) and received approval from the Key Research Center for Automobiles and Automobile Parts (a research organization).</p>
<p><u>Improvements in education, research conditions, and the environment:</u> The project enabled universities to (i) conduct new research and experiments utilizing up-to-date equipment not available before the project. (A variety of research was made possible by the combination of basic and core equipment provided through this project and the practical equipment provided via the university's own funds. In addition, there were many cases in which this project provided expensive equipment that a university or region only had one piece of, such as the nuclear magnetic resonance device provided to Shenyang University of Chemical Technology.) (ii) increase opportunities for training and practical experience by increasing the amount of equipment per student. (When equipment was being brought in, in some cases at the departmental or analysis center level, the value of equipment installed via this project comprised more than a 50% share of the total equipment value.) (iii) use the equipment brought in to provide more practical classes and improve student understanding, and (iv) make foundational improvements to education and research by promoting digitization through providing library systems, for example.</p>
<p><u>Recruitment of human resources:</u> The fact that universities participating in this project have more specialized equipment than other universities shows that the project contributed to raising the standard of research at these universities, and succeeded in recruiting exceptional doctorate recipients who seek out advanced research that uses this specialized equipment.</p>

Source: Interviews with the universities

Furthermore, the following effects of soft aspect were confirmed in interviews with participating universities and teachers who participated in training in Japan: development of core human resources to lead universities, establishment of new courses and courses in Japanese, improvement of disciplines and laboratories, improvement of research standards and development of heretofore untried research that is advanced or in new fields, improvement of educational methods, improvement of university administration, and human resource recruitment.

Table 10 Effects in Soft Aspect

<p><u>Development of core human resources to lead universities:</u> At all universities, training participants were positioned as key human resources who would lead the university. Many participants were promoted when they returned to China and are now serving important roles such as head instructors in key laboratories in universities and departments. The majority of training recipients have written research papers that employ the outcomes of their training in Japan after returning to China.</p>
<p><u>Establishment of new courses and courses in Japanese:</u> Some universities have established new courses using the knowledge and data they obtained through training in Japan. Specifically, courses related to Japan such as accounting courses taught in Japanese, “Japan’s economic challenges,” and “History of Economic Development in Postwar Japan” have been newly established, increasing opportunities to learn about Japan.</p>
<p><u>Improvement of disciplines and laboratories:</u> In many cases, universities utilized training from the standpoint of effectively advancing new initiatives such as establishing new disciplines and laboratories or shoring up key disciplines, and then employed the resulting outcomes. In such cases, many universities demonstrated more effective improvement by combining improvements in soft and hard areas. Some universities also employed IT in laboratory management (building equipment reservation systems and websites for various researchers’ research results and data, and so on) using examples from Japan as a reference.</p>
<p><u>Improvement of research standards and development of heretofore untried research that is advanced or in new fields:</u> Participating universities stated that they began new research (biofuel cells, Alzheimer’s, biomass-based synthetic rubber, etc.) and they also revealed that they achieved a higher research standard (such as receiving awards for superior master’s theses on a provincial level or obtaining patents), because of the cutting-edge research fields and research equipment they encountered in Japan. Other resultant outcomes included approval for national research projects. Some universities also brought in new equipment based on the training in Japan and future research prospects.</p>
<p><u>Improvement of educational methods:</u> In many cases, teachers are practically applying the educational methods from Japanese universities they learned through training. For example, instructors (i) in terms of how to enhance students’ capacity, create lesson plans, consider them with students, and share the results; and (ii) send students materials for classes in advance so that students can give lectures and exchange opinions rather than having the instructor give a one-sided lecture.</p>
<p><u>Improvement of university administration:</u> In feedback on training regarding university administration, participants shared that the training suited the need for promoting modernization and raising administrative standards amid changes in the environment such as the expanding size and systemic reforms of Chinese universities. There are many examples of specific changes made that reflect a shift toward a student-focused mindset, like reforms to campus culture such as setting up furniture like tables across campus to create an environment wherein students can have discussions.</p>
<p><u>Recruitment of human resources:</u> When training in Japan, participants recruited Chinese students who studied in doctoral programs at Japanese universities as the university teachers.</p>

Training contributed to recruiting superior human resources and improved universities' research standards.
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Source: Interviews with the universities and training participants

3.3.2 Impacts

3.3.2.1 Intended Impacts

(1) Improvements in educational and research outcomes

Indicators achieved as a result of improvements in educational and research outcomes are organized in Table 11.

Excluding the rate of advancement to graduate school, improvement was observed for the following indicators compared to the pre-project figures: graduation rate, employment rate, number of award-winning research papers, number of patented research outcomes, and number of published research papers. Marked quantitative improvement was observed for the following indicators: number of award-winning research papers; number of patented research outcomes; and number of research papers published in the SCI (Science Citation Index), EI (Engineering Index), and ISTP (Index to Scientific & Technical Proceedings).

The fact that the majority of the above indicators improved demonstrates that quantitative and qualitative improvements in education and research at the participating universities concretely manifested as externally recognized results.

Table 11 Changes in Main Educational/Research Indicators (Impacts)
(Participating Universities)

	Baseline	Actual	Actual
	2004	2012	2016
		Initial Planned Year of Completion	1 Year after Project Completion
Number of award-winning research papers (state level)	6	23	22
Number of award-winning research papers (provincial/ministerial level)	111	199	147
Number of patented research outcomes	54	351	532
Number of research papers (Social Science Citation Index: SSCI)	1	8	27
Number of research papers (SCI/EI/ISTP)	387	3,305	4,058
Graduation rate	96.9%	95.4%	97.0%
Graduate employment rate	92.4%	94.4%	93.7%
Rate of advancement to graduate school	13.2%	12.9%	13.1%

Source: Questionnaire responses from universities

Note: 1) Rates are the average of participating universities, while other figures are the total of participating universities. 2) The number of universities that responded with baseline values and actual values are as follows: 8 universities for number of award-winning research papers at the state level, 9 universities for the same category at the provincial/ministerial level, 10 universities for number of patented research outcomes/number of research papers (SSCI), 11 universities for number of research papers (SCI/EI/ISTP), and 9–13 universities for graduation rate, graduate employment rate, and rate of advancement to graduate school. 3) The target value for the graduation rate one year after the completion of the project is 97.5%. There is no target value for the other indicators.

(2) Expansion of education/research at the provincial level

Indicators for higher education at the provincial level are shown in Table 12. Although the target for number of students per teacher was not achieved, the following indicators exceeded their target values and showed significant improvement: number of universities, number of students, floor area per student, and amount of educational/research equipment per student. The universities participating in this project represent the top regular higher education institutions in the province and play a major role in improving these higher education indicators at the provincial level.

Table 12 Higher Education Indicators in Liaoning Province

	Baseline	Target	Actual	Actual
	2004	2012	2012	2016
		1 Year after Project Completion	Initial Planned Year of Completion	1 Year after Project Completion
Number of regular higher education institutions (HEIs)	70 schools	60 schools	112 schools	116 schools
Number of students at HEIs	860,000	1,100,000	1,199,717	1,230,158
Number of students per teacher	15.6	12.0	17.2	17.5
Floor area per student (m ² /person) (= floor area/number of students)	14.6 m ² /person	20.0 m ² /person	26.6 m ² /person	30.5 m ² /person
Amount of educational/research equipment per student (yuan/person)	5,357 yuan	7,250 yuan	8,749 yuan	12,736 yuan

Source: Documents provided by JICA, questionnaire responses from executing agency

(3) Regional revitalization, strengthening of market rules, and contributions to environmental conservation

It was difficult to collect quantitative data of the status of the impacts on the following three development agendas expected at the time of the appraisal: regional revitalization, strengthening of market rules, and environment conservation.

Furthermore, larger universities were conducting numerous projects other than this one, making it difficult to observe the impacts of this project. However, the below examples of contributions made by the project were observed.

(a) Regional revitalization

The universities participating in this project included major universities in science and technology, education, medicine, and social sciences, and the universities are developing and producing target human resources in fields essential to regional revitalization. In addition to utilizing the equipment procured under the project at participating universities to advance research that contributes to promoting regional industries in Liaoning Province, key industries such as information technology, biochemistry, energy saving, and environmental conservation are one primary source of employment opportunities for graduates, meaning that the number of employed people increases alongside the number of graduates.

As development of key industries (industry-academia partnerships) is an important policy matter for all provincial governments, universities implement many projects commissioned by government administrations, primarily the provincial government, which contribute to regional revitalization. In many cases, the equipment provided by this project is used in these projects. Furthermore, expensive equipment provided by this project has been registered on a large equipment sharing platform by science and technology universities in the province, and many examples exist that other universities or external institutions achieved results by using that equipment. Some examples of industry-academia and external partnerships are described below.

- Jinzhou City's key industry is automobile parts, and in 2013, the Electric Vehicle Propulsion Technology Laboratory became a province-level key laboratory. The laboratory conducted joint research with a local company to turn an electrical control unit into a product. (Liaoning University of Technology)
- Medical equipment given to universities has been used as a public good by medical personnel in a city. For example, one university is a center for forensic medicine and training for declarations of death. (China Medical University)
- The nuclear magnetic resonance device provided by this project is an advanced piece of equipment even on the provincial level, and is used to provide services such as sample measurement analysis requested by other universities and structural analysis needed for pharmaceutical companies to develop new drugs. (Shenyang University of Chemical Technology)

(b) Strengthening of market rules

As the number of students increases, so too does the number of graduates in related fields overall. In addition, from the standpoint of strengthening market rules, universities have recently been characterized by their emphasis on and active promotion of the development of human resources who will be immediate assets at work and contribute to business activities. Specific examples of implemented initiatives related to the strengthening of market rules include the formation of new accounting classes in Japanese and promotion of modernization by universities using the content of training on administration.

(c) Contributions to environmental conservation

In response to a growing need in China, the environmental field has become a key field at many universities, which are attempting to strengthen their environment-related disciplines. After the start of this project, some environmental disciplines were newly established or designated as key disciplines, and the number of graduates in environmental fields has increased.

Environmental conservation is also a key field in the provision of educational equipment in this project. Universities often took on research project grants or commissioned projects, and the equipment provided by this project was utilized in some of these cases. Furthermore, as described below, university teachers who received training in Japan presented what they learned during their training in their research and at symposiums.

- The University of Science and Technology Liaoning jointly held symposiums on environment and economy with Korean universities and the Saitama Institute of Technology, which had been a training site, multiple times, and has held debates regarding economic development and environment conservation.
- Professor Feng of Liaoning Technical University used Japanese ideas to conduct the research course “Waste Collection Methods and Recycling at Solid Waste Processing Stations” over three years from 2014 to 2016.
- Professor Zhou of Shenyang Agricultural University learned about the construction of a recycling-oriented society in Japan, particularly the three Rs (reduce, reuse, recycle), and presented them in various settings after returning to China.

3.3.2.2 Other Positive and Negative Impacts

(1) Impacts on the natural environment

No negative impact on the natural environment has been noted. According to interviews with the Provincial Department of Education and asset management staff at participating universities, environmental impact assessments for the construction of school buildings were properly implemented. Although at the time of appraisal, an undesirable impact on the environment was expected to be at a minimum, because construction sites were within university grounds, the impact on the environment was regularly checked (including through surprise inspections) by the Municipal Environment Bureau, especially when construction was in progress. No major issues with the natural environment were indicated. Furthermore, according to the relevant staff at universities and executing agency, no external complaints regarding the environment were made, because construction took place on campus. When improvements to oversight for noise or construction materials were deemed necessary, members of the project investigated what measures might be needed. These measures were based on regular standards according to construction plans and there was no difference from usual practice. However, according to involved staff members at the executing agency, the international cooperation aspect of the project meant that the inspections for environmental impact by the Municipal Environment Bureau tended to be slightly more frequent and stricter than for other projects. This resulted in improved construction methods/construction timelines (e.g., restrictions for noisy work at night) and management/construction methods (e.g., more frequent water sprinklings to prevent dust).

(2) Resettlement and land acquisition

With school building construction taking place on existing campus, there was no resulting resettlement and land acquisition, and no negative impact on the social environment was noted, as planned at the time of appraisal.

(3) Promotion of cooperation/interaction between Chinese and Japanese universities

Although there were differences among universities, there was a confirmed impact on the promotion of cooperation and interaction with Japanese universities. Most universities for which an effect was confirmed had a track record of interaction in the past that they were able to strengthen through this project. Specific instances in which an effect was observed are described below.

Table 13 Examples of Interaction/Cooperation with Japanese Universities

<p><u>Dalian Polytechnic University:</u> Although only the School of Textiles and Materials at the university had a relationship with Gunma University, other schools such as the School of Foreign Languages used this project as an opportunity to start interacting with Gunma University. In addition, the School of Foreign Languages began sending students to Japan for short-term winter exchanges (with credits recognized).</p>
<p><u>University of Science and Technology Liaoning:</u></p> <ul style="list-style-type: none"> • This university used sending personnel for training as an opportunity to jointly establish the Magnesium Alloy Research Center with the Saitama Institute of Technology. (The Anshan area, where the University of Science and Technology Liaoning is located, is rich in magnesium resources.) This joint research has resulted in 12 joint research papers. • After the training was concluded, the university invited experts in the field of environmental management from the Kanagawa University multiple times and held academic exchange events.
<p><u>Liaoning Technical University:</u> After returning to China, trainees who had been sent to the Tohoku Institute of Technology established the Sino-Japanese Center, made progress in joint research, and reached an agreement in 2017 between the two universities regarding plans to conduct future research on earthquake resistance.</p>
<p><u>Shenyang Agricultural University:</u> After returning to China from training, trainees promoted long-term interaction and cooperation with the teachers and students of the Department of Agriculture at Kyoto University. As of the ex-post evaluation, three trainees from Shenyang Agricultural University were studying abroad at Kyoto University. Furthermore, after returning to China, the advising professor during training was invited three times to Shenyang Agricultural University.</p>
<p><u>Shenyang University of Chemical Technology:</u></p> <ul style="list-style-type: none"> • This school has cooperative agreements with Gunma University, Toyama Prefectural University, Hokuriku University, and Hirosaki University, and is currently in talks with the Japan Advanced Institute of Science and Technology. The cooperative agreements are for foreign exchanges with credit recognition and others. In total, 75 students have been sent from Shenyang University of Chemical Technology, and the school has accepted 103 students from Japan. The director of the School of International Education also participated in training in Japan, promoting that cooperation. • The advising professor during training at University of Toyama was designated as a specially appointed professor at Shenyang University of Chemical Technology, and three students were sent to University of Toyama.
<p><u>Dalian Medical University:</u> Dalian Medical University employed this project as an opportunity to enter into a cooperative exchange agreement with Nagasaki University. The agreement consists of visits by students from each school to the other. Thus far, four students have been sent to Japan and four students from Nagasaki University have been accepted.</p>

Source: Interviews with the universities and training participants

As described above, this project has largely achieved its objectives. Therefore, effectiveness and impacts of the project are high.

3.4 Sustainability (Rating: ③)

3.4.1 Institutional/Organizational Aspect of Operation and Maintenance

The roles of the involved institutions are clear. As planned during the appraisal, universities are in charge of the operation and maintenance (O&M) of the equipment

and facilities provided by this project, and the relevant bureaus at the Provincial Department of Education, which is the executing agency, supervise this. At all participating universities, the facilities and equipment provided through this project are part of the university's fixed assets, and O&M systems are maintained according to large equipment O&M fund management procedures, experimental education work regulations, and fixed asset management procedures, which also define responsibilities and procedures. To improve unified management, universities with a large amount of equipment have adopted comprehensive management systems through "large equipment centers" for precise or expensive devices including those provided by this project. Universities are also taking steps to actively hire teaching staff to ensure they have the necessary number of teachers for operation and equipment usage. No issues with personnel numbers have been noted. As equipment is brought in, some universities have been hiring multiple students who completed doctorate degrees as members of the university teaching staff, and these doctorate holders are highly specialized human resources.

3.4.2 Technical Aspects of Operation and Maintenance

All the universities conduct regular maintenance checkups and send equipment to be repaired by outsourced contractors such as suppliers. Thus far, no technical issues have arisen in terms of O&M. The universities have assigned full-time laboratory technicians who uniformly operate and maintain large experimental devices and provide precise measurements or analysis, which ensures the availability of the necessary technology. At all the universities, manuals and warnings for individual devices are displayed close to the devices, ensuring they are easily visible. Instructors responsible for the O&M of precision devices receive the necessary technical training from manufacturers regularly. In some universities, users obtained know-how to effectively utilize advanced equipment through training in Japan. Another example shows through training of undergraduate and graduate students on operation of equipment, those who acquired the technical knowledge are allowed to operate the equipment after obtaining a certificate valid within the university.

3.4.3 Financial Aspect of Operation and Maintenance

No problems have been observed in terms of the O&M finances necessary to maintain the effects of the project. The budget for providing equipment and O&M at participating universities is comprised of grants from the country or province (public expenditures) and independent earnings such as tuition and profit from commissioned projects. According to the interviews with the universities, public financial support of

universities from the provincial government was gradually increased under *the Eleventh Five-Year Plan (2006–2010)*, and further improved in *the Twelfth Five-Year Plan (2011–2015)*. The provincial education budget in 2015 was approximately 2.4 times the actual spending in 2007. Furthermore, it became easier for universities to mobilize financial resources from banks, for example. According to interviews with the executing agency and universities, although there are differences among universities, the central government provides minimum annual public support of millions of yuan, and combined with the provincial government support, large universities receive more than 50 million yuan per year with which they obtain equipment and conduct O&M. Both the provincial education budget and university budgets are stable, and according to the interviews, the result is that universities actively update and improve various equipment. Among the main equipment procured through this project, none have fallen into disuse because of budget shortfalls for operation and repairs. Increases in public financial support are expected in the future.

Table 14 Public Expenditure Results for Liaoning Province

(Unit: 100 million yuan)

	2013	2014	2015
Educational expenses	669.48	604.49	610.24
Educational expense index (2007 = 100)	266	240	242

Source: Liaoning Province statistical data and questionnaire responses from executing agency

3.4.4 Status of Operation and Maintenance

At all universities, the equipment provided by this project is registered in the database for control and management. In addition, some universities have also installed surveillance cameras for expensive equipment or introduced systems in which only related personnel with a key card can enter the room where it is housed. Visual inspection and usage records/inspection records for each piece of equipment were used to confirm that the status of facilities and equipment was positive overall. For important devices, every university has users record the status of the device in the usage records each time they use it. While aging is becoming an issue for some devices with short service lives such as PCs, they are still currently in use. Furthermore, although it was observed that some equipment was out of order, nearly all were in the process of being repaired. For inventory and the purchasing of consumables, each school responded that there were no issues regarding maintaining inventory as long as the items were still in production.

As described above, no major problems have been observed in the institutional, technical, financial aspects and current status of the operation and maintenance system. Therefore, sustainability of the project effects is high.

4. Conclusions, Lessons Learned, and Recommendations

4.1 Conclusion

This project aimed at improving education and research at 15 universities in Liaoning Province by improving facilities and equipment as well as training teachers. The project was highly relevant and performed according to the higher education human resource policies of China and Liaoning Province. Furthermore, it aligned with China's and Liaoning Province's development needs for quantitative and qualitative expansion of education at universities and Japan's ODA policy. Therefore, relevance is high. In terms of effectiveness, increases and improvements were evident for many indicators related to quantitative and qualitative improvement. It was also confirmed that the project contributed to obtaining approval for founding new graduate schools and key disciplines or laboratories, and improved education, research conditions, and the environment. In terms of impacts, the universities involved in the project demonstrated substantial improvements compared to the pre-project period for indicators such as employment rate, number of award-winning research papers, number of patented research outcomes, and number of published research papers. In addition, in terms of contributions to regional revitalization, strengthening of market rules, and environmental conservation, the development of human resources in related fields at participating universities became more robust, and various initiatives are making progress through both commissioned and research projects. There are also many examples of how cooperation and mutual understanding has been fostered between Chinese and Japanese universities. As such, the effectiveness/impact is high as outcomes were produced mostly as planned. Because the project cost was slightly higher and the project period significantly lasted longer than planned, the efficiency is low. No major problems have been observed in the institutional, technical and financial aspects of the operation and maintenance, as well as in the status of the operation and maintenance.

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

4.2 Recommendations

4.2.1 Recommendations to Executing Agency

None

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

The importance of thoroughly discussing and sharing information of the proper form for realistic procurement packages with executing agency

Experiences from past Chinese human resource training projects (the ODA loan “Inland Higher Education Projects [Regional Vitalization, Market Reform Support and Environmental Conservation [Guangxi Zhuang Autonomous Region] [Jiangxi Province] [Hubei Province] [Shanxi Province]”) revealed an important lesson; Standard university procurement packages (product-based packages) that require time for reconciliation among universities should be limited to highly universal devices like PCs or those that can be procured in bulk at a reduced price. Instead, procurement through individual university packages (university-based packages) should be standard. Based on that past lesson, this project initially planned to procure equipment through individual university packages (university-based packages) as the default. However, the executing agency proceeded with procurement using standard university packages (product-based packages) as the default, making the process more time consuming. As a result, procurement was time-consuming overall, and this was one of the causes of project delays.

When the set-up of procurement packages is expected to have a major impact on the efficient implementation of a project and improvement of its results, it is important to warn executing agencies starting in the appraisal period and thoroughly discuss the proper form for realistic procurement packages. After that, initiatives should be strengthened and project management geared toward supporting this end.

END

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
<p>① Project Outputs</p> <p>(1) Hard improvements</p> <p>a. School building construction</p> <p>b. Provision of educational equipment</p> <p>(2) Soft improvements</p> <p>Training, expert acceptance, and joint research in Japan</p>	<p>Participating universities s: 15 universities in Liaoning Province</p> <p>Educational buildings etc. at 3 universities</p> <p>Total 38,000 m²</p> <p>Economics, finance, pathology, biochemistry, electrical/electricity-related, safety technology-related, soil science, fermentation-related, applied science, education, multimedia-related, etc.</p> <p>265 persons</p>	<p>Same as planned</p> <p>1 university (School of International Education building)</p> <p>Total 19,000 m²</p> <p>Mostly as planned</p> <p>295 persons</p> <p>(No results for expert acceptance or joint research from Japan)</p>
<p>② Project Period</p>	<p>June 2006–March 2011</p> <p>(58 months)</p>	<p>June 2006–December 2015</p> <p>(115 months)</p>
<p>③ Project Cost</p> <p>Amount Paid in Foreign Currency</p> <p>Amount Paid in Local Currency</p> <p>Total</p> <p>ODA Loan Portion</p> <p>Exchange Rate</p>	<p>6,016 million yen</p> <p>3,234 million yen</p> <p>(236 million yuan)</p> <p>9,250 million yen</p> <p>5,775 million yen</p> <p>1 yuan = 13.7 yen</p> <p>(as of September 2005)</p>	<p>5,650 million yen</p> <p>4,955 million yen</p> <p>(332 million yuan)</p> <p>10,605 million yen</p> <p>5,650 million yen</p> <p>1 yuan = 14.9 yen</p> <p>(Average of period from June 2006–December 2015)</p>
<p>④ Final Disbursement</p>	<p>October 2015</p>	