People's Republic of China

FY 2018 Ex-Post Evaluation of Japanese ODA Loan Project

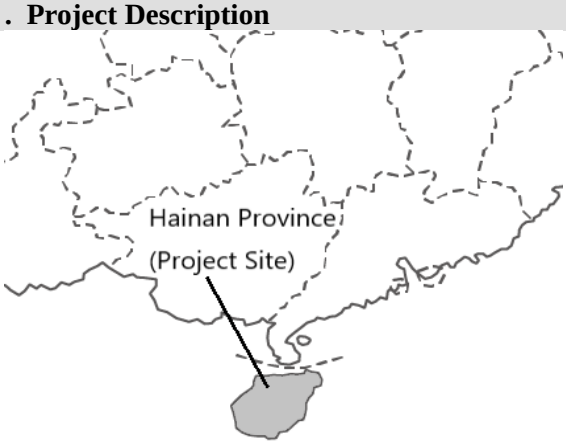
"Higher Education Project (Hainan Province)"

External Evaluator: Toshihiro Nishino, International Development Center of Japan Inc.

0. Summary

The Project was implemented to improve the education and research at a total of three universities in Hainan Province by means of constructing buildings, improving facilities and equipment and training teachers. The relevance of the Project is high as it is consistent with the policies of the Government of China and Hainan Provincial Government for higher education resources, the development needs of China to achieve the quantitative and qualitative expansion of universities and Japan's ODA policy. As a positive effect of the Project, the quantitative and qualitative expansion of higher education at the target universities was achieved, including satisfactory improvement in terms of both the tangible and intangible aspects of higher education and a significant improvement of various educational indicators. The effectiveness and impacts of the Project are high as shown by the improved outputs of educational and research activities, making the best use of the advanced equipment and outcomes of training in Japan. Moreover, various efforts regarding local vitalization, environmental conservation, etc. have made progress through improved educational and research activities. In regard to the efficiency of the Project, although the outputs are believed to have been generally achieved as planned, the project cost exceeded the planned cost. Coupled with the substantial extension of the project period, the overall efficiency of the Project is judged to be low. The sustainability of the Project is high as there were no problems with the institutional, technical and financial aspects of the Project together with confirmation of the good operation and maintenance of the facilities and equipment. In the light of the above, the Project is evaluated to be highly satisfactory.

1. Project Description



Project Location

China-Japan Friendship Exchange Center constructed under the Project (Hainan University)

1.1 Background

Prior to the Project, China was facing the necessity to strengthen educational and research activities pertaining to areas relating to market rules and environmental issues because of the promotion of reform and open-door policy since 1978 and the emergence of environmental issues following the accelerating drive towards a market economy and rapid economy growth in the aftermath of China's accession to the WTO.

Moreover, an economic gap between regions had become apparent, making it essential to improve both the quantity and quality of higher education through local vitalization and increase of the demand for higher education in Hainan Province and other under-developed regions. In response, the Government of China in its 10th Five Year Plan (2001 - 2005) adopted such targets as a 15% enrolment ratio for higher education, 16 million students in higher education and enhancement of human resources development in the fields of law, finance, trade and other.

Although Hainan Province (covering an area of 34,000 km^2 with a population of 8.11 million (2004)) belongs to coastal regions where the level of development is relatively high, its income and educational conditions were well below those of other coastal provinces and were on the same level as those of undeveloped inland provinces because of it being a new province established in 1988 after its separation from Guangdong Province. The 10th Five Year Educational Plan of Hainan Province (2001 – 2005) called for an increase of the higher education enrolment rate to 15% and an increase of the number of students to 72,000 by 2005 (the actual results in 2000 were 8% and 40,000 students respectively). For the quantitative and qualitative expansion of higher education in Hainan Province, it was necessary to deal with tangible constraints (shortage of buildings and equipment), intangible constraints (necessity to train teachers) and financial constraints.

1.2 Project Outline

The purpose of the Project was to achieve the quantitative and qualitative expansion of higher education at three target universities which played an important role for local vitalization, strengthening of market rules and environmental conservation in Hainan Province through assistance in terms of the hard component (improvement of buildings, equipment, etc.) and soft component (training, etc. of staff members), thereby contributing to the development of human resources capable of advancing the strengthening of market rules, environmental conservation and local vitalization[1]. The target universities are given below.

Hainan University (South China University of Tropical Agriculture which was a target university at

[1] This ex-post evaluation features the project targeting Hainan Province in "the Human Resources Development Project", an ODA loan project implemented for universities in 23 inland provinces, cities and autonomous regions in China.

the time of the start of the Project was later merged with Hainan University), Hainan Normal University and Hainan Medical College (total: three universities).

Loan Approved Amount / Disbursed Amount	3,150 million yen/3,009 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	June 2006/June, 2006
Terms and Conditions	Interest rate: 1.5 %/0.75% Repayment period: 30 years/40 years (Grace period: 10 years/10 years) Conditions for Procurement: General untied
Borrower/Executing Agency	Government of the People's Republic of China/ Hainan Provincial People's Government
Project Completion	June, 2016
Main Contractor (Over 1 billion yen)	-
Main Consultant (Over 100 million yen)	-
Related Studies	Feasibility Study by Hainan Provincial Building Standards Design & Research Institute (July, 2005) JICA: "Survey to Support the Implementation of Human Resources Development Projects in FY 2001" (2003) JICA: "Survey to Support Training under Human Resources Development Projects" (2004) JICA: "Special Assistance for Project Implementation (SAPI) for Inland and Human Resources Development Project in China" (2005) JICA: "Study on Human Resources Development Using ODA Loan" (2010)
Related Projects	

2. Outline of the Evaluation Study

2.1 External Evaluator

Toshihiro Nishino, International Development Center of Japan Inc.

2.2 Duration of Evaluation Study

The ex-post evaluation study for the Project was conducted over the following period.

Duration of the Study: February, 2019 – January, 2020

Duration of the Field Survey: May 5 – 24, 2019 and August 18 – 24, 2019

2.3 Constraints during the Evaluation Study

It was originally planned to employ the random sampling method for the selection of interviewees in

the interview survey with beneficiaries from lists of users of constructed school buildings and research and educational equipment and training participants to ensure the objectivity of the survey. However, because the executing agency had no experience of using the random sampling method, it was decided to entrust the concrete selection of the target persons to individual universities while designating the some details of desired interviewees (selection of a certain number of interviewees from both users of school building and equipment and training participants satisfying specified gender, age bracket, research field and other parameters). Therefore, the findings of the interview survey do not necessarily fully represent the opinions of the project beneficiaries, etc.

３．Results of the Evaluation (Overall Rating: B[2])

3.1 Relevance (Rating: ③[3])

3.1.1 Consistency with the Development Plan of China

The purpose of the Project is consistent with the five year development plans, five year plans for the education sector and other education-related strategies at both the national and provincial levels at the time of appraisal and at the time of this ex-post evaluation in that "the Project aims at developing advanced human resources capable of responding to social needs through the quantitative as well as qualitative expansion of higher education for the purpose of achieving socioeconomic development and the correction of regional gaps". At the national level, emphasis is continually placed on the fostering and expansion of core/prioritized universities in the Midwestern Region and a number of relevant projects are in progress.[4] While there has not been any major policy change between the appraisal stage and ex-post evaluation stage, the 13th Five Year Plan (2016 – 2020) adopts the policy of "gradually increasing the number of universities and academic disciplines of world class while establishing the world's first class universities and courses"[5].

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

3 ③: High, ②: Fair, ①: Low

4 Hainan Province is not usually considered to belong to the Midwestern Region but the Higher Education Promotion Plan for the Midwestern Region (2010 – 2020) and other projects assisting higher education in this region include Hainan Province in their project areas.

5 The policy aimed at developing world-class universities and disciplines is called "double first-class" policy. A university needs to have high reputation in terms of both tangible and intangible aspects to be listed as a sponsored university under this policy.

Table 1 Principal Objectives of Development Plans Relating to the Project

Type	At the Time of Appraisal	At the Time of Ex-Post Evaluation
National Development Plan	10th Five Year Plan (2001 – 2005); Increase of the higher education enrolment rate to around 15% by 2005.	13th Five Year Plan (2016 – 2020): Aims at improving the quality and productivity of the labor force through the enhancement of national education to achieve a country with strong human capital. Continual promotion of university reform, etc. (The numerical target for higher education is a higher education enrolment rate of 90% or higher).
Nationwide Educational Development Plan	10th Five Year Plan for Education (2001 – 2005): Increase of the number of enrolled higher education students to 16 million by 2005; Development of human resources with high level skills to deal with adjustment of the industrial structure caused by high-tech, biotechnology and advanced manufacturing technology, etc.; support for higher education institutions of a relatively high level in the Western Region; enhancement support for teacher training	13th Five Year Plan for Education (2016 – 2020) and National Plan for Medium and Long-Term Education Reform and Development (2010 – 2020): Promotion of "the construction of first class universities and first class courses", "strengthening of the fostering of core/prioritized universities in the Midwestern Region", etc.; increase of the higher education enrolment rate from 26.5% (2010) to 40% (2020).
Provincial Level Educational Development Plan	10th Five Year Plan for Education of Hainan Province (2001 – 2005): (Targets) ① higher education enrolment ratio: 15% in 2005 to 20% in 2010; ② number of university students: 96,000 in 2010	13th Five Year Plan for Education for Hainan Province (2016 – 2020): "Qualitative improvement of education in a diverse manner" and "strengthening of linkage with foreign educational institutions" (Targets) ① Higher education enrolment ratio: 50%; ② number of university students: 225,000

Source: Materials provided by JICA and relevant plan documents

3.1.2 Consistency with the Development Needs of China

At the time of both appraisal and ex-post evaluation, there is a clear need for the quantitative and qualitative expansion of education at the three target universities.

At the time of appraisal, it was anticipated that the need for the quantitative expansion of higher education would grow to reduce the economic gap between Hainan Province and other coastal provinces as described in 1.1 Background and also in line with the spread of primary and secondary education in Hainan Province. The demand forecast at the time suggested that the number of higher education enrolments in Hainan Province would be approximately 8.5 times in seven years, prompting the central government to urge the provincial government to strengthen both the tangible aspect (expansion of buildings and equipment) and intangible aspect (teacher training) to respond to such an increase of the educational need. The interview survey for this ex-post evaluation found that

all local universities struggled to achieve such expansion because there was only limited financial support at the time of appraisal and the introduction or renewal of educational equipment in particular made hardly any progress. Even at the principal universities controlled by the provincial government, which were targeted by human resources development projects, there was a total funding shortage.[6]

At the time of the ex-post evaluation, the interview survey with senior members and those in charge of the Project of the provincial education agency and target universities has identified the need to maintain economic growth through "the further strengthening of market rules" and "local vitalization" to eliminate the gaps (GDP per capita[7], etc.) between Hainan Province and other coastal provinces. Following the designation of Hainan Province as an experimental zone for free trade in 2018, there is an even stronger need for advanced human resources. Meanwhile, "environmental conservation" has become a prioritized area for human resources development and a discipline to be strengthened at all universities because of the increasing need caused by slow progress of the improvement of pollution, etc. The number of enrolments in higher education has been steadily increasing and the need for the quantitative and qualitative expansion of higher educational institutions is still strong. As far as the future of higher education in China is concerned, even though the emphasis is shifting from quantitative expansion to qualitative expansion as typically expressed by the policy of "promoting the construction of first class universities and first class disciplines", there is still a continuous need for the balanced expansion of quantity and quality. This current situation reflects the increasing demand for advanced human resources at the post-graduate level, following ① the successful quantitative expansion of higher education during the 12th Five Year Plan period (2011 – 2015) and ② improvement of China's economic and industrial levels. The target universities of the Project are core universities nurtured by the Provincial Education Agency. As part of these universities is also targeted by the Project to Support Higher Education in the Midwestern Region, the Project is consistent with the targets of the Government of China and the provincial government to foster education.

3.1.3 Consistency with Japan's ODA Policy

All of Japan's Economic Cooperation Program for China (2001; Ministry of Foreign Affairs), Medium-Term Strategy for Overseas Economic Cooperation Operations (April, 2002, JICA) and Country Assistance Policy for China (2002, JICA) at the time of appraisal supported China's reform and open-door policy. They emphasized human resources development from the viewpoint of

[6] University expenditure in China is met by government (national and provincial, etc.) grants and self-raised funds through tuition fees, etc.

[7] The actual GDP per capita in 2017 was 48,430 CNY for Hainan Province and an average of 70,163 CNY for coastal provinces.

adjusting the domestic economic structure in China in the aftermath of accession to the WTO and also prioritized assistance for inland regions from the viewpoint of redressing regional gaps. As such, the Project is consistent with Japan's ODA policy. The Country Assistance Strategy for China listed the "vitalization of local areas and exchange", "strengthening of market rules" and "environmental conservation" as priority areas for human resources development.

Although Hainan Province is geographically on the coast, its selection as a target for Japan's assistance is in line with the above-mentioned ODA policy, etc. of Japan because ① the conditions of education in the province lagged relatively behind as in the case of inland regions at the time of appraisal, making the expansion of higher education an urgent task and ② the GDP per capita of the province (9,450 CNY in 2004) was substantially below the average (27,802 CNY in 2004) for coastal provinces.

Based on the above, the Project is highly relevant as the implementation of the Project is fully consistent with not only the development plan as well as the development needs of China at the time of both appraisal and ex-post evaluation but also with the ODA policy of Japan at the time of appraisal.

3.2 Efficiency (Rating: ①)

3.2.1 Project Outputs[8]

The degree of output achievement is as shown in the attached "Comparison of the Original and Actual Scope of the Project" at the end of this report. In regard to the hard component of the Project, the planned construction of eight buildings for Hainan University and South China University of Tropical Agriculture using an ODA loan was revised following the merger of these two universities. The revised plan was the construction of five buildings for Hainan University, increasing the total construction area (floor area). In response to the changed need for merger and resulting rapid expansion of the scale, the planned contents of the construction work were changed in a flexible manner to ensure the construction of efficient buildings to match the new situation of Hainan University, including the construction of large-scale classrooms and construction of a general office which could be used by multiple institutes. At the time of appraisal, the constructed buildings were assumed to be used by important organizations to facilitate exchanges with Japan. Although the contents of the building construction work were substantially changed, the institutes, laboratories, etc. housed in these buildings are engaged in wide-ranging activities and, as such, have some relationship with Japan, including exchanges with Japanese universities and other stakeholders. The

8 For evaluation of the project outputs and quantitative effects, comparison of the target values for four universities, including South China University of Tropical Agriculture, and actual values for the currently existing three universities was conducted as South China University of Tropical Agriculture merged with Hainan University.

China-Japan Friendship Exchange Center, one of the buildings constructed under the Project, was supposed to have bodies related to Japanese studies, such as “Japan Culture Research Center” at the original planning stage. However, from the viewpoint of improving the operational efficiency to ensure smooth communication within the Institute of Foreign Languages, it was decided that these bodies related to Japanese studies would be better established at the Institute of Foreign Languages to which they would belong. Consequently, the new China-Japan Friendship Exchange Center building has no specific bodies related to Japanese studies. The actual changes made to the building construction and floor area were in response to the changed situation and needs of the university and there were no major issues with the output of the building work. The fact that the originally planned exchange bodies with Japan were not housed in the China-Japan Friendship Exchange Center poses an issues, however, as one reason for the selection of the target building as part of the ODA loan project was its use to facilitate the relationship with Japan even though the change was made to improve the efficiency of the intended operation of these bodies.

In regard to the provision of educational equipment under the Project, nine procurement packages were planned and implemented almost as planned with some changes described next. In regard to Package 8 (IT equipment), procurement using the ODA loan was cancelled as local funds on the Chinese side were used to meet the cost of equipment of which earlier renewal was found to be necessary. Meanwhile, the lengthening of project implementation meant adjustment of the equipment to be procured due to changes of need and necessity to change the equipment specifications. The overall quantity of educational equipment introduced under the Project was slightly less than planned because of the ① progressive depreciation of the yen during the project period, ② relatively high bidding prices with the lack of any restrictions on the highest bidding price in international tenders and ③ exclusion of equipment already procured by the Chinese side from the scope of procurement using the ODA loan following an increase of the procurement prices. The educational equipment of which procurement under the ODA loan project was cancelled was separately procured using the own funds of the Chinese side. This made a slight change to the contents of the equipment but the unchanged equipment was procured as planned. It is, therefore, fair to say that the tangible outputs were achieved generally as planned.

Table 2 Actual Results of Building Construction

University	Planned	Actual
Hainan University	7 buildings: 84,000 m^2	No. 4 Mathematics Building: 22,845 m^2; Laboratory for Social Science Courses Group and Administration Office: 28,126 m^2; Laboratory for Tropical Agriculture and Life Science Courses Group: 14,350 m^2; China-Japan Friendship Exchange Center: 30,065 m^2; Research and Development Center: 28,027 m^2 (total: 5 buildings; 123,413 m^2)
South China University of Tropical Agriculture	1 building: 17,000 m^2	-
Total	101,000 m^2	123,413 m^2

Source: Replies to the questionnaire survey with the executing agency.

A graduate student doing her research using the educational equipment installed under the Project (Hainan University)

Conference room of the China-Japan Friendship Exchange Center constructed under the Project (Hainan University)

Under the Project, training was conducted at Japanese universities (in principle, training was conducted on an individual basis at a target university with the person hoping to receive training individually selecting the accepting university and professor (tutor)) as the soft component with a view to enhancing the specialty of staff members of the target universities. The actual outputs of this soft component are shown in Table 3.

Table 3 Training Results

	Planned	Actual	Actual/Planned Ratio
Training	90 persons	164 persons	182%
(Number of long-term dispatch of individuals among the trainees)	(90 persons)	(121 persons)	(134%)
Acceptance of experts (to China)	23 persons	17 persons	74%
Joint research	10 cases	10 cases	100%
Total	123	191	155%

Source: Replies to the questionnaire survey with the executing agency.
Note: The "Long-term dispatch of individuals" means the type of training whereby a teacher in a specialist field is individually dispatched for a long period of time to a Japanese university".

The actual number of trainees was 191 persons/cases which was 155% of the planned figure (123 persons/cases). When the focus is placed on the type of training of "the individual dispatch of a teacher in a specialist field to a Japanese university for a long period of time (long-term training in a specialist field)", 121 persons underwent this type of training (134% of the planned figure), exceeding the originally planned level. The target universities of the Project utilized their past established network with certain Japanese universities while individual staff members searched for suitable accepting universities using a list of Japanese universities provided by JICA. As a result, matching with the accepting universities progressed relatively smoothly. Because of the worsening of the political relationship between Japan and China during the project period, some of the planned training were cancelled by the accepting universities because of concern regarding trainee safety. However, the number of such cancellations was small and the scale of the training was little affected. In contrast, the actual number of accepted experts was lower than planned. The actual number of joint researches was the same as planned but such work was conducted at only one university. According to the results of interviews with staff members of the target universities, the three main factors for the poor performance in terms of the acceptance of experts and joint research at many universities were ① training at a Japanese university was thought to produce better effects because of "the longer learning period" and "learning while observing the real conditions at advanced Japanese universities and various organizations first hand" (as a result, the actual number of trainees increased), ② local universities with little experience of exchanges with Japanese universities took a long time to establish a viable relationship with an accepting university, making the implementation of joint research or acceptance of an expert difficult and ③ use of the ODA loan provided under the Project for training was judged to be more effective as the acceptance of experts and joint research could be arranged using the budget for different projects.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The details of the total project cost are shown in Table 4. The actual project cost was 6,967 million yen (147% of the planned cost) and the total amount of disbursed ODA loan was 3,009 million yen. The total project cost exceeded the planned project cost.

In the case of educational equipment and training, the actual project cost was almost as planned because of the adjustment of the quantity, etc., including the procurement of cancelled educational equipment (due to bidding prices exceeding the planned prices) using local funding. In contrast, the building construction cost of 5,099 million yen was more than double the planned cost of 2,514 million yen. The domestic currency portion in particular was 3,357 million yen, which was 4.6 times

the planned 726 million yen. It is difficult to compare the planned cost of buildings with the actual cost because of the significant change of the contents of the building construction work following the merger of the target universities. According to the results of interviews with staff members of the target universities, the reasons for the massive increase of the construction cost despite the much smaller 20% increase of the floor area are ① the rapid depreciation of the yen since 2013 made it necessary to rely on domestic currency to compensate for the shortfall of the project funding (foreign exchange rate: 1 CNY = 13.7 JPY at the time of appraisal to 1 CNY = 15.1 JPY as the mean exchange rate for the entire project period) and ② the unit prices of the construction materials significantly increased. As most of the factors pushing up the project cost were beyond the control of the Project, it is fair to say that the project cost was generally controlled in an appropriate manner.

Table 4　Planned and Actual Project Costs

Unit: million yen

	Planned (at the Time of Appraisal)						Actual					
	Foreign Currency Portion		Domestic Currency Portion		Total		Foreign Currency Portion		Domestic Currency Portion		Total	
	Sub Total	ODA Loan Portion	Sub Total	ODA Loan Portion	Sub Total	ODA Loan Portion	Sub Total	ODA Loan Portion	Sub Total	ODA Loan Portion	Sub Total	ODA Loan Portion
1.Construction of Buildings	1,788	1,788	726	0	2,514	1,788	1,742	1,742	3,357	0	5,099	3,357
2. Educational Equipment	1,078	1,078	347	0	1,425	1,078	1,105	1,105	274	0	1,379	1,105
3.Training	167	167	0	0	167	167	162	162	0	0	162	162
Interest during Construction	422	117	224	0	646	117	327	0	0	0	327	0
Total	3,455	3,150	1,297	0	4,752	3,150	3,336	3,009	3,631	0	6,967	3,009

Source: Materials provided by JICA and replies to the questionnaire survey with the executing agency.
Notes: Foreign exchange rate: planned rate: 1 CNY = 13.7 JPY (September, 2005); actual rate: 1 CNY = 15.1 JPY (mean exchange rate for 2006 through 2016)

3.2.2.2　Project Period

The actual project period of 121 months substantially exceeded the planned project period of 58 months (207% of the planned period).

Table 5　Planned and Actual Project Periods

	Planned (at the Time of Appraisal)	Actual
Signing of the Loan Agreement	June, 2006	June, 2006
Entire Project Period	June, 2006 ～ March, 2011 (Project period: 58 months)	June, 2006 ～ June, 2016 (Project period: 121 months)
Construction of Buildings	July, 2006 ～ June, 2009	December, 2008 ～ June, 2016
Educational Equipment	July, 2006 ～ June, 2008	March, 2008 ～ December, 2013
Training	October, 2006 ～ March, 2011	April, 2007 ～ March, 2014

Source: Materials provided by JICA and replies to the questionnaire survey with the executing agency.

Although there were many causes of the excessive extension of the project period, the interview survey with stakeholders at the executing agency found four main factors as listed below. The exceeding project period was mainly caused by factors which were difficult to control under the Project. It is, therefore, fair to say that the management of the Project was generally conducted in an appropriate manner.

- Changes of the contents of the building construction work due to the merger of the target universities made revision of the construction plan, approval of the revised plan, etc. a lengthy process.
- The increased unit prices of the construction materials for the buildings made it necessary to adjust the procurement contents and to approvethe adjusted contents in China.
- In connection with the introduction of educational equipment, a certain period of time among the universities was required to change some of the specifications and to adjust the procurement plan because of the procurement of some of the equipment by the Chinese side. For the tender and procurement of some equipment, the price negotiations experienced difficulty, delaying their delivery.
- The deterioration of the political relationship between Japan and China affected the dispatch of Chinese personnel to Japan for training and other aspects of the Project to a certain extent from the second half of 2009.

In previous human resources development projects in China using a common package for all universities involved for the introduction of educational equipment, changes of the equipment to be introduced required some time for adjustment among the universities, constituting a major factor for the delayed introduction of educational equipment. In the case of the present Project, however, the number of target universities was only three. Even though the actual project period (for the introduction of educational equipment) exceeded the planned period, situations such as “a significant delay of the signing of the contract for many packages” and “absence of much of the planned equipment at the end of the original planned period” which were confirmed in other provinces were not observed in Hainan Province. The introduction of most of the educational equipment as planned under the Project made it possible to conduct educational and research activities using the new equipment generally as planned.

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

In view of the nature of the Project, no internal rates of return have been calculated at the time of appraisal.

The project cost exceeded the plan and the project period significantly exceeded the plan. Therefore, the efficiency of the Project is low.

3.3 Effectiveness [9] (Rating: ③)

The effectiveness of the Project has been analyzed from the viewpoint of both quantitative effects, including the performance of operating indicators set at the time of appraisal, and qualitative effects concerning the improvement of the quality of education and research.

3.3.1 Quantitative Effects (Operation and Effect Indications)

(1) Quantitative Expansion of Education and Research

At the time of appraisal, the "number of enrolled students", "building floor area" and "total cost of the educational equipment" were set as indicators for the "quantitative expansion of education and research". The actual performance of these indicators is shown in Table 6 and Table 7 where considerable improvement is observed. The facilities and equipment provided under the Project have been utilized up to the present, contributing to the overall quantitative expansion of higher education in Hainan Province.

Firstly, the number of enrolled students at each target university significantly increased. The number one year after (2017) the completion of the Project was 68,000 (94% of the target figure). Although this figure was lower than the target (72,000) by 3,000, it was a substantial increase of 26,000 (57%) when compared to the figure for 2004. Such a large increase was experienced by almost all of the target universities. The figure for 2019 is 73,000, achieving the target.

[9] Sub-rating for Effectiveness is to be put with consideration of Impacts.

Table 6 Number of Students (Total of Research, Full-time and Special Course Students) and Building Floor Areas (Classrooms, Laboratories, Library, Gymnasium and Lecture Hall) (Total of Target Universities)

Indicators	Baseline	Target Value	Actual Value		
	2004	2012	2012	2017	2019
	Reference Year	One year after the completion of the Project	One year after the completion of the originally planned project	One year after the completion of the Project	Three years after the completion of the Project: at the time of ex-post evaluation
Number of Enrolled Students	42,000	72,000	60,000	68,000	73,000
Building Floor Area (m^2)	4,890,000	11,650,000 (101,000)	15,691,000 (23,000)	17,294,000 (123,000)	17,294,000 (123,000)

Source: Materials provided by JICA and replies to the questionnaire survey with the executing agency.

Notes

1) Research students, full-time students and special course students are equivalent to post-graduate students, graduate students and college students respectively.
2) The bracketed actual values in parentheses are floor areas newly introduced under the Project.

Secondly, the building floor area of the target universities also significantly increased as in the case of the number of enrolled students. The actual value one year after the completion of the originally planned project (2012) was 15,691,000 m^2 (total for all of the universities), already achieving the target figure of 11,650,000 m^2 (135% of the target figure). This means that the floor area almost tripled in approximately eight years from 2004 (increase of 10,801,000 m^2). The building floor area continually increased thereafter, reaching 17,294,000 m^2 in 2017, one year after the completion of the Project (the same figure for 2019 three years after the completion of the Project).

The total invested value of educational equipment at the target universities significantly increased, partly because Chinese domestic funds were used to improve the educational equipment at these universities in parallel with the Project. No target value for the actual value of educational equipment was set at the time of appraisal and the value in 2012, one year after the completion of the originally planned project, for all of the target universities, was 680 million CNY, which had more than doubled in approximately eight years from 2004. The questionnaire and interview surveys with each university found that there was a major shortage of educational and research equipment at every university at the time of appraisal but that the situation was improved through the Project. As of 2019, the rate of contribution of the Project to the total value of educational and research equipment was rather limited at approximately 6% but the role played by the ODA loan to create a platform for education and research at universities through the installation of basic equipment which had been lacking was highly evaluated by university personnel. The buildings and equipment provided under the Project have been used in an effective manner as shown by their high utilization rates.

Table 7 Total Cost of Educational Equipment (Total for the Target Universities)

Unit: million CNY

	Baseline	Target Value	Actual Value				
	2004	2012	2012		2017		2019
	Reference Year	One year after the completion of the Project	One year after the completion of the originally planned project		One year after the completion of the Project		Three years after the completion of the Project: at the time of ex-post evaluation
	All Universities	Project	All Universities	Project	All Universities	Project	All Universities
Equipment Total	330	79	680	67	1,300	91	1,440

Source: Materials provided by JICA and replies to the questionnaire survey with the executing agency.

(2) Qualitative Improvement of Education and Research

At the time of appraisal, the "floor area per student" and "educational equipment value per student" were set as indicators for the "qualitative improvement of education and research". The actual performance of these indicators is shown in Table 8 where a major improvement can be observed because of the larger increases of the floor area and investment in educational equipment compared to the increased number of students. Both the floor area per student and educational equipment value per student (simple mean value for those of the target universities) achieved their respective target values in 2012, one year after the completion of the originally planned project (floor area per student: target value of 15.5 m^2 and actual value of 21.5 m^2; educational equipment value per student: target value of 5,817 CNY and actual value of 10,462 CNY). Further improvement was achieved by 2017, one year after the completion of the Project.

Table 8 Floor Area and Educational Equipment Cost per Student

	Baseline	Target Value	Actual Value		
	2004	2012	2012	2017	2019
	Reference Year	One year after the completion of the Project	One year after the completion of the originally planned project	One year after the completion of the Project	Three years after the completion of the Project: at the time of ex-post evaluation
Floor Area per Student (m^2)	12.5	15.5	21.5	21.6	22.2
Educational Equipment Value per Student (CNY)	4,536	5,817	10,462	17,464	18,688

Source: Materials provided by JICA and replies to the questionnaire survey with the executing agency.
Notes
1) Simple mean value of those of target universities.
2) The national standards (for ordinary university faculties) vary depending on the faculty. The floor area per student varies from 9 m^2 for the Faculty of Medicine to 22 m^2 for the social science faculties. The equipment value per student varies from 3,000 CNY for social science faculties to 5,000 CNY for science faculties such as Engineering, Agriculture and Medicine.

Of the indicators related to educational and research activities, the performance of "representative indicators showing the effects of the quantitative and qualitative expansion of higher education (outcome indicators) is compiled in Table 9. While some improvement was made for each indicator, particularly significant improvement can be observed for the number of priority laboratories (provincial grade[10]), number of faculty courses, number of MA courses and number of research projects (both national and provincial grades)

According to the results of interviews with senior staff members and those in charge of the Project at the target universities, the Project, especially the improvement of educational equipment, made a major contribution to the approval of research projects and priority laboratories, etc. After the commencement of the Project, one university introduced MA courses while another university introduced Ph.D. courses. Although every indicator showed a significant improvement compared to 2004, four indicators (number of priority courses in terms of both national and provincial/ministerial grades, number of MA courses and number of Ph.D. courses) failed to achieve their respective target values at the time of ex-post evaluation (2019, three years after the completion of the Project). The factor given for this non-achievement of these targets is the restriction of new approvals based on the policy of the provincial government.

[10] Those designated by "province" or "ministry", such as the Ministry of Education, are classified as "provincial/ministerial grade" while those designated by "state" are classified by "national grade".

Table 9 Historical Changes of Principal Educational and Research indicators (Outcomes)

(Total of the Target Universities)

	Baseline	Target Value	Actual Value		
	2004	2012	2012	2017	2019
	Reference Year	One year after the completion of the Project	One year after the completion of the originally planned project	One year after the completion of the Project	Three years after the completion of the Project: at the time of ex-post evaluation
Number of Priority Courses (National Grade)	1	10	3	3	3
Number of Priority Courses (Provincial/Ministerial Grade)	17	54	17	23	23
Number of Priority Laboratories (National Grade)	0	-	1	2	2
Number of Priority Laboratories (Provincial/Ministerial Grade)	0	-	17	19	16
Number of Faculty Courses	84	-	150	177	191
Number of MA Courses	51	168	45	57	94
Number of PH.D. Courses	7	29	5	9	14
Number of Research Projects (National Grade)	11	-	115	137	147
Number of Research Projects (Provincial/Ministerial Grade)	70	-	214	273	292

Source: Materials provided by JICA and replies to the questionnaire survey with the executing agency.

Note: Those indicators for which the target value was not set at the time of appraisal are also included in indicators subject to evaluation.

3.3.2 Qualitative Effects

(1) Effects of the Hard Component

There are six confirmed positive effects of the hard component of the Project: ① contribution to the introduction of new graduate schools and also to the approval of priority courses and laboratories, ② contribution to the listing of dual first class universities and departments, ③ contribution to the improved evaluation of universities by the Ministry of Education, ④ improvement of the conditions and environment for education and research, ⑤ improvement of the research level and extension of research into advanced/new fields where no research was conducted in the past and ⑥ enhancement of the fund raising capacity. Further details of these effects are explained in Table 10.

Table 10 Positive Effects of the Hard Component

Positive Effect	Details
Contribution to the introduction of new graduate schools and also to the approval of priority courses and laboratories	• Since the implementation of the Project, the target universities have enjoyed an increased number of new graduate schools and number of approvals of priority courses and laboratories. For these new graduate schools and approvals, the availability of suitable buildings and educational equipment is an important indicator for judgement. There are cases where improvement by the hard component of the Project has made a positive contribution (establishment of new Ph.D. courses at Hainan Normal University and new MA courses at Hainan Medical College).
Contribution to the listing of dual first class universities and departments	• A dual first class policy, meaning the construction of world's first class universities and courses, has been introduced in China. Hainan University is the only university subject to the construction of world's first class courses in Hainan Province. To achieve listing as a subject of the "dual first class policy", it is essential to obtain high level evaluation results in terms of both the tangible and intangible aspects. Improvement by the hard component of the Project in particular has greatly contributed to the enhanced status of Hainan University.
Contribution to the improved evaluation of universities by the Ministry of Education	• Universities in China undergo periodic evaluation by the Ministry of Education for which the situation of facilities and educational equipment is an important indicator. There are many cases where improvement by the hard component of the Project has led to successful or even excellent evaluation results by the Ministry of Education (Hainan University in 2017; Hainan Normal University in 2018).
Improvement of the conditions and environment for education and research	• Finely structured education has become possible at Hainan University due to the prioritized investment in the construction of ① large classrooms in response to the increased size of the university and ② office to facilitate exchanges between teachers and students. • To be more precise, active efforts were made to ① implement new research and experiments using the latest equipment as well as basic equipment which were lacking prior to the Project (the introduction of basic equipment and core equipment under the Project has enabled wide-ranging research together with the introduction of applied equipment using the own funds of the Chinese side; there are many cases of the introduction under the Project of very expensive equipment of which only one is available at each university or even province), ② increase the opportunities for training and practice through an increase of the number of equipment per student, ③ implement more practical teaching using the newly introduced equipment and improved understanding of students and ④ develop efficient research activities (instead of borrowing equipment from an external organization, the availability of the university's own equipment has enabled more efficient and advanced research activities). • Core equipment as well as expensive equipment required for basic research was introduced under the Project, establishing a firm platform for education and research at universities. At the time of introducing such equipment, there were cases where the equipment investment by the Project accounted for almost one-quarter of the entire equipment value of a faculty or analysis center (body where a range of important equipment for a university was centrally installed and managed).
Improvement of the research level and extension of research into advanced/new fields where no research work	• The observation of and contact with the most advanced research fields and research equipment in Japan has improved the research level at the target universities (implementation of highly advanced analysis at the nano level, etc.) and also led to the commencement of new research (detailed analysis related to the seismic structure of buildings).

was previously conducted	• Subsequent positive outcomes include the approval of a national research project. At some universities, new equipment was introduced based on training in Japan and in preparation for the further development of research work (functional film research equipment was introduced at Hainan University based on understanding obtained during the training that such equipment is essential for advanced level research).
Improvement of the fund raising capacity, including bank loans	• Prior to the implementation of the Project, the capacity to raise funds from banks, etc. of all of the target universities was inadequate. As a result of the improvement of such infrastructure as educational equipment, etc. under the Project, their fund raising capacity has improved. The ODA loan played the important role of funding the consolidation of infrastructure.

Source: Replies to the questionnaire survey with the executing agency.

(2) Effects of Soft Component

According to the results of the interview survey with senior members and those in charge of the Project at the target universities and the training participants, many of them highly evaluated the soft component of the Project, i.e. training at a Japanese university, etc., as a useful opportunity to learn about the contents of advanced research and education as there were few opportunities at the time of the implementation of the Project to undergo long training sessions on specialist knowledge abroad (especially in Japan) except for those associated with certain universities.

Five positive effects of the soft component were confirmed, i.e. ① fostering of the core human resources shouldering universities/higher education, ② strengthening of courses, tutorials, etc., ③ improvement of the educational method, ④ improvement of university management and ⑤ recruitment of better human resources, as detailed in Table 11.

Table 11 Positive Effects of the Soft Component

Positive Effect	Details
Fostering of core human resources shouldering universities/higher education	• Many of the training participants are considered core personnel at their universities as senior members of graduate schools, heads of laboratories, etc. • Many of the participants were promoted on return to their universities. At the time of ex-post evaluation, they have important functions as professors responsible for priority laboratories, etc. Most of the participants have produced a variety of theses since their return, utilizing the training outcomes. • The training under the Project is considered a means of human resources development and the participants have flourished since the training. One of the trainees has become the dean of a university in Hainan Province.
Strengthening of courses, tutorials, etc.	• There are many cases where the training outcomes have been utilized for the introduction of new courses, tutorials, etc. and strengthening of priority courses from the viewpoint of effectively promoting new approaches. There are also multiple cases of the various materials collected in Japan proving useful. The combination of the hard component and soft component under the Project has helped to effectively strengthen courses, tutorials, etc.
Improvement of the educational method	• There are many cases of the former trainees (professors) practicing the educational methods of a Japanese university which they learned during the training. • To be more precise, concrete examples of improvement include ① joint preparations and examination of a study plan on how to proceed with the education of students and sharing of the results, ② sending of learning materials to students prior to lessons so that the students themselves can conduct a lecture and exchange opinions instead of one-sided lectures by teachers and ③ strengthening of guidance to improve the English competency of students based on the re-recognition of the importance for students to prepare and present academic papers in English.
Improvement of university management	• The interview survey with senior members and those in charge of the Project at the target universities and the training participants revealed a positive attitude towards a short training course on university management as such a course is in line with the "need to promote modernization and improve the management standard". Concrete examples of useful training contents for university management are given below. - Intensive cleaning of university facilities, etc. have been implemented based on understanding of the necessity to improve university management - As the trainees were impressed by the work of an employment support center which is not commonly available in China, individual guidance and consultation services are made available to help students decide on a better career and suitable profession. - New practices based on examples in Japan include the use of a private company for dormitory management and the creation of a drug-related company which is made possible based on a joint venture to raise funds from the private sector.
Recruitment of better human resources	• During the training in Japan, a recruitment drive was held to employ Chinese Ph.D. students studying in Japan as future university teachers. This means that the training has contributed to the recruitment of excellent personnel and improvement of the research standard at the target universities.

Source: Replies to the questionnaire survey with the executing agency.

3.4 Impacts

3.4.1 Intended Impacts

(1) Improvement of Educational and Research Outputs at the Target Universities

Of the indicators related to educational and research activities, "those considered to be achievable as a result of improved educational and research results (impact indicators)" are compiled in Table 12.

While most of the indicators improved, the actual values of the number of patents awarded and number of theses in 2017, one year after the completion of the Project, far exceeded the respective baselines in 2004, achieving especially high growth. The graduation rate, employment rate and graduate school advancement rate also recorded an improvement at most of the universities.

The fact that most of the impact indicators showed improvement is believed to suggest that the target universities have strived to improve their educational and research outcomes based on a qualitative and quantitative expansion of education and research.

Table 12 Historical Changes of Principal Educational and Research Indicators (Total of the Target Universities)

	Baseline	Target Value	Actual Value		
	2004	2012	2012	2017	2019
	Reference Year	One year after the completion of the Project	One year after the completion of the originally planned project	One year after the completion of the Project	Three years after the completion of the Project: at the time of ex-post evaluation
Number of Awards for Research, etc. (National Grade)	0	-	0	0	0
Number of Awards for Research, etc. (Provincial Grade)	10	-	18	12	52
Number of Patents Awarded	2	-	27	89	38
Number of Theses (SSCI)	2	-	9	25	34
Number of Theses (SCI・EI・ISTP)	56	-	826	1,513	1,647
Graduation Rate	-	93.0%	94.6%	96.3%	96.5%
Employment Rate of Graduates	86.5%	-	92.3%	92.7%	93.4%
Advancement Rate to Graduate Schools	3.1%	-	10.5%	13.5%	14.0%

Source: Materials provided by JICA and replies to the questionnaire survey with the executing agency.

Notes: 1) Those indicators for which the target value was not set at the time of appraisal are also included in indicators subject to evaluation.

2) SSCI: Social Science Citation Index; SCI: Science Citation Index; EI: Engineering Index; ISTP: Index to Scientific & Technical Proceedings.

Box 1: Outcomes for Priority Courses for Assistance by the Project (Contribution of the Project)

In past human resources development projects implemented in other provinces in China, many cases involved development efforts using China's domestic funds after the introduction of educational equipment and the construction of buildings with an ODA loan. Because of such practice, the contribution of an ODA loan project could be judged in a relatively clear manner. In Hainan Province, however, development under the Project and development using domestic funds progressed simultaneously, making the contribution of the Project less clear. In this evaluation, therefore, efforts are made to ascertain the contribution of the Project by means of comparing the achievement of the educational and research indicators by the priority courses assisted by the Project with the achievement of the same indicators at university level. For reference, some 18% of the educational equipment introduced under the Project was allocated to priority courses.

The improvement situation in relation to the outcome indicators based on comparison of 2004 and 2017 and 2019 shows strong growth of the total equipment value, especially the equipment value per student, for priority courses of the target universities in general, reflecting the active investment in equipment under the Project. However, all other indicators did not change much. A similar trend is observed with the impact indicators with their outcomes under the Project varying from one indicator to another. The factors behind this trend are that ① the indicator values for the priority courses for assistance were already relatively high in 2004 compared to other courses, ② the introduction of basic equipment with strong potential for common usage for wide-ranging courses and disciplines at many universities under the Project meant wide-ranging benefits for courses, etc. other than the priority courses and ③ efforts were made to improve other courses using domestic funds in view of the progressive improvement of the priority courses for assistance under the Project, resulting in the improved level of all the courses (overall adjustment of investment amount in each course) .

Based on the above and in view of the actual performance of the educational and research indicators, it is reasonable to judge that the Project implemented simultaneously with development using China's domestic funds has contributed to the overall enhancement of educational equipment, etc. at the target universities, thereby contributing to the general improvement of these universities (the improvement of each indicator is the combined result of development efforts using the ODA loan and domestic funds).

(2) Expansion of Education and Research at the Provincial Level

The performance of the higher education indicators at the provincial level is shown in Table 13. In 2017, one year after the completion of the Project, all provincial-level quantitative indicators assumed at the time of appraisal exceeded their respective target values except for the number of students per teacher and graduation rate. All of the quantitative indicators achieved their target values

in 2018, two years after the completion of the Project. As the target universities of the Project are highly ranked in terms of size, etc. among ordinary higher educational institutions in the province, they play a major role in the improvement of the provincial-level higher education indicators.

Table 13 Higher Education Indicators for Hainan Province

	Baseline	Target Value	Actual Value		
	2004	2012	2012	2017	2018
	Reference Year	One year after the completion of the Project	One year after the completion of the originally planned project	One year after the completion of the Project	Two years after the completion of the Project
Number of Ordinary Higher Educational Institutions	14	18	17	19	20
Number of Student at Ordinary Higher Educational Institutions	78,030	136 ,000	171,969	207,309	211,845
Higher Education Enrollment Ratio	17%	25%	28%	40%	48%
Building Floor Area per Student (m^2)	13.9	17.2	23.9	31.6	31.2
Educational Equipment Value per Student (CNY)	4,196	5,835	7,295	12,237	12,691
Number of Students per Teacher	20.0	20.0	20.2	19.7	20.8
Graduation Rate	98%	98%	97%	96%	94%
Employment Rate of Graduates	86%	89%	86%	92%	93%

Source: Materials provided by JICA and replies to the questionnaire survey with the executing agency.

(3) Contribution to Local Vitalization, Strengthening of Market Rules and Environmental Conservation

In regard to the impacts on the three assumed development issues at the time of appraisal, ① local vitalization, ② strengthening of market rules and ③ environmental conservation, the collection of quantitative data showing the overall situation is difficult. Moreover, it is difficult to clarify the impacts of the Project as larger universities are implementing many other projects. Nevertheless, the following cases of contribution have been confirmed.

Local Vitalization

The target universities include principal universities for science and engineering, educational, medical and social science disciplines, producing those human resources which are essential for local vitalization. Research and support work contributing to the principal industries (agriculture, tourism, etc.) of Hainan Province are in progress at the target universities, utilizing various facilities and equipment. These priority industries and inland area now constitute important employment destinations for graduates due to an expansion of demand and the scope of employment has widened in line with an increased number of graduates. As the fostering of priority industries and development

of poor areas are priority policy agendas of the provincial government, each university implements many projects entrusted by the provincial government and other government organizations, contributing to local vitalization. The number of teachers posted or dispatched to rural areas from universities has greatly increased. There are many cases of the joint involvement of a university in local vitalization with a local government or intra-regional organization (see Box 2).

Box 2: Support for Promotion of the Cultivation of Tropical Agricultural Products

Hainan University is actively supporting the promotion of the cultivation of tropical agricultural products, which are the main agricultural products in Hainan Province, using the educational equipment, including a soil analyzer, introduced under the Project.

Hainan Ecological and Agricultural Science & Technology Co., Ltd. is using some 4,000 mu (approximately 2,667,000 m^2) of farmland for the cultivation of dragon fruit. With the support of Hainan University, the company has been conducting new activities, such as the ① introduction of organic farming using pigs, ducks, etc., ② improvement of the control level during the harvesting season using lighting, ③ introduction of new varieties which are of high quality and are highly resistant to damage caused by diseases and pests, ④ strengthening of disease and pest control measures, ⑤ introduction of an irrigation system using hoses and ⑥ production of an alcoholic drink using dragon fruit as the raw material. As a result, the company now enjoys wide-ranging benefits such as ① an increase of the sales prices, ② quality improvement, ③ increased yield, ④ reduced cultivation cost and ⑤ achievement of environment-friendly cultivation. The company regularly hosts training sessions, etc. for local farmers cultivating dragon fruit while disseminating the know-how obtained from Hainan University. As such, the support activities of Hainan University have greatly contributed to the promotion of dragon fruit cultivation in Hainan Province.

Cultivation of dragon fruit

Pigs reared for organic cultivation

Hainan Hungan Co., Ltd. is a new company engaged in the cultivation of honey pomelo (a large citrus fruit) and is cooperating with Hainan University in terms of the ① development of and education on cultivation techniques, ② development of organic cultivation through the introduction of organic fertilizer, etc. and ③ collection of seeds as resources and development of new varieties. Such cooperation has led to the good reputation of the company, including winning of the Gold Award for its honey pomelo at a competitive exhibition of agricultural products held in the province. In connection with the development of and education on cultivation techniques, the criteria for the cultivation and management of honey pomelo have been established. Using these criteria, guidance has been provided for some 300 local poor agricultural households to convert to the cultivation of honey pomelo, achieving a better income and breaking free from poverty for these households. As such, the support activities of Hainan University have proved to be beneficial for the cultivation of special local agricultural products and the breaking free from poverty by local farming households.

Cultivation of honey pomelo

Harvested honey pomelo

Strengthening of Market Rules

There has been a steady trend among higher educational institutions in China to obtain university status and the number of students has been increasing. The number of graduates of the relevant faculties (Faculty of Law, Faculty of Accounting and Business Management, etc.) of the target universities has generally shown an increasing trend. However, the actual number of graduates of the relevant faculties has failed to achieve the target (42,184 for three universities, while the actual figure for 2017, one year after the completion of the Project, is 7,748) because of the rejection by the provincial government to approve a further increase of the student quota. Meanwhile, the target universities are characterized by their promotion of the development of human resources as immediate assets capable of performing assigned work from the viewpoint of strengthening the market rules. There are many examples of the school buildings (large lecture rooms, etc.) and educational equipment (computing equipment. etc.) introduced under the Project being intensively utilized.

Contribution to Environmental Conservation

The environment field has become a priority field at many universities in China, reflecting the growing need, and many universities are attempting to strengthen their related courses. There have been cases of environment-related courses being designated as priority courses after the commencement the Project, and the number of graduates in the environment field is showing a generally increasing trend. It is one of the priority fields for the improvement of educational equipment and training under the Project. However, the actual number of graduates in this field failed to achieve the target value (target value of 3,798 for all three universities; actual value of 2,451 one year after the completion of the Project) because of the rejection by the provincial government to approve a further increase of the student quota. Nevertheless, there have been many cases of a university being commissioned to conduct a project with a research project grant (of the National Natural Science Fund, etc.) or an administrative body. The equipment provided under the Project is used in some cases and former trainees are also involved in such projects. There has been a case of the involvement of a university teacher in development work in cooperation with a local government and intra-regional organization (see Box 3).

Box 3: Support for the Construction of Environmental Conservation Type Facilities

Professor Yu Long Shi of Hainan Normal University provides wide-ranging support for environmental conservation, improvement for organizations, etc. in Hainan Province utilizing the knowledge and know-how obtained through the training in Japan.

Yun She Song Shou Hainan Zhong Guo Village, one of the beneficiaries of his support, is a facility

aimed at giving visitors the experience of a rural lifestyle surrounded by nature with the motto of promoting natural conservation type development. Under Professor Yu's guidance, efforts are made to construct environmental conservation type facilities. More specifically, approaches such as the ① utilization of environment-friendly local resources, ② achievement of agriculture without agro-chemicals and fertilizer, ③ promotion of the reuse of construction materials used for the facilities and ④ strengthening of the waste water treatment system have been adopted. Because of such emphasis on the environment, this has become a model for the coexistence of environmental conservation and development and its use as a venue for environmental education for visitors, etc. is planned. This type of support for environmental conservation is expected to play a major role in the promotion of environmental conservation in Hainan Province.

(4) Promotion of Cooperation and Mutual Understanding Between Japanese and Chinese Universities

Actual exchanges between the target universities and accepting universities in Japan since the completion of the training are shown in table 14 (average figures per university). The actual activities included mutual short visits by professors, mutual dispatch of students and joint events, such as joint research and joint seminars.

Table 14 Post-Training Exchanges with Accepting Universities (Up to the present: average figures per university)

	Average per Target University
Number of inter-university exchange agreements	2.0
Number of short visits to Japan	6.0
Number of short visits to China	3.0
Number of students accepted	12.6
Number of students dispatched	33.3
Number of joint researches	4.3
Number of joint events	3.3

Source: Replies to the questionnaire survey with the executing agency

The number of actual exchanges with a Japanese university greatly varies from one target university to another. While there is one university with virtually no exchanges with Japanese universities, others have adopted proactive policies such as ① making it compulsory for training participants to prepare a post-training cooperation promotion plan and ② dispatch of multiple teachers to the same Japanese universities and faculties. University in particular has concluded a cooperation agreement with several Japanese universities (Hainan University has concluded cooperation agreement with Gunma University, Department of Urban and Civil Engineering of

Ibaraki University, Graduate School of Law of Nagoya University and Faculty of Law of Aoyama Gakuin University) through the Project, establishing a base for continuous exchanges and recording mutual visits by teachers and other exchange activities. Hainan University made almost half of its teachers of Japanese language participate in the training under the Project to improve their Japanese competency. Its subsequent efforts to establish a good relationship with Japanese universities have led to the expansion of short training in Japan for its students. The interview survey with stakeholders at the target universities found that the interests of students in overseas training primarily focused on Western countries prior to the implementation of the Project. However, the Project has prompted ① stronger interest in Japanese universities among students and ② the establishment of a relationship with Japanese universities. Consequently, Japan had the highest share of overseas training destinations in 2018. Some concrete examples of cooperation between Japanese and Chinese universities are listed in Table 15.

Table 15 Actual Examples of Cooperation and Promotion of Mutual Understanding Between Japanese and Chinese Universities

Chinese University	Japanese University	Actual Example
Hainan University	Gunma University	• It was decided to conclude an exchange agreement for the mutual dispatch of teachers and students for a period of five years, to promote exchanges. • Several teachers, including Assistant Professor Hu Wen Feng, have experience of staying at Gunma University for approximately one year to conduct research activities.
	Department of Urban and Civil Engineering, Ibaraki University	• Assistant Chief Gui Hong Xing spent approximately six months at Ibaraki University as a visiting researcher to conduct research work. • Dr. Chen Yong conducted research on superconductors, etc. in cooperation with research institutes of Ibaraki University and other institutions.
	Graduate School of Law, Nagoya University	• In 2009, Professor Honma of Nagoya University visited Hainan University and made an academic presentation entitled "Trends of Reform of Judicial System and Code of Civil Procedure in Japan" to an audience of 500 people. • Professor Honma also consulted with the Vice-Principal and other senior members of Hainan University on the promotion of exchanges. As a result, three teachers are currently conducting research at Nagoya University.
	Faculty of Law, Aoyama Gakuin University	• Professor Dobashi visited Hainan University in the period from 2010 to 2011 to give a series of lectures entitled "Historical Changes of the Theory of the Company Act in Modern Japan and Analysis of Important Legal Precedents". These lectures with many concrete cases were highly evaluated by students. • Professor Fujimura and others visited Hainan University to discuss ways to promote exchanges between the two universities. They were also involved in reporting and discussions on various themes, including "Boundary Issues and Japan-China Cooperation".
	Shiga Prefectural University and other	• 25 persons were dispatched for short training sessions from 2015 to 2017.

Source: Replies to the questionnaire survey with the executing agency.

At the China-Japan Friendship Exchange Center which was constructed under the Project at Hainan University, more than 200 exchange events involving Japanese and other overseas universities and organizations and various stakeholders are held every year using its conference rooms, illustrating the functioning of the Center as an overseas exchange base for Hainan University. Some concrete examples of exchange are listed in Table 16.

Table 16　Examples of Exchange Events with Japan and Other Countries Using the China-Japan Friendship Exchange Center

	Event	Date
1	Hainan University &Tokyo University: Student Exchange for the Protection of Natural Resources of Hainan Island	July, 2018 August, 2019
2	Hainan University & Ibaraki University: Conference on Sustainable Human Resources Development	2019
3	First Meeting of the International Advisory Committee, Hainan University: Graduate School Ceremony on the Belt and Road Initiative at Hainan University	March, 2019
4	Co-sponsorship by the Chinese Institute of Electronics, Nanjing University of Information Science and Technology, Michigan State University and Donghua University of Taiwan: Fourth International Academic Conference on Cloud Computing and Security	June, 2018
5	International Review of Responses of Coral Symbionts to Climate Change and Human Activities	December, 2018
6	Joint sponsorship by Hainan University and Chia Nam University of Pharmacy and Science of Taiwan: International Symposium on Unmanned System for Agriculture, Ecosystem and Environment	November, 2018
7	International Conference on Structural Fatigue, Failure Theory and Practical Technology	January, 2018
8	Training for the Management of Public Policies in Pakistan	August, 2019

Source: Replies to the questionnaire survey with the executing agency.

Box 4:　Establishment of the Foundations for University Growth Using the Project (Hainan University)

At the time of the implementation of the Project, Dean Li Jian Bao of Hainan University was facing the slow progress of the development of the university's educational and research environment even though the scale of the university had expanded because of the successful merger of Hainan University with South China University of Tropical Agriculture. Under these circumstances, the university actively promoted improvement of the educational environment utilizing the Project. In regard to the construction of buildings, the original plan was modified to place emphasis on the construction of classrooms, teachers' rooms and administrative offices, all of which were insufficient to accommodate the increased number of students and staff members. In connection with the building construction work, particular emphasis was placed on efficiency by means of constructing buildings which could be commonly used by multiple courses and schools. Consequently, compact and low cost buildings were successfully constructed. Active efforts were also made under the Project to improve the shortage of educational equipment. The achievement of buildings and educational equipment of a certain level by the Project has made it easier for Hainan University to borrow loans from banks, further facilitating the development of infrastructure.

With his own experience of studying in Japan, Mr. Li has emphasized exchanges with foreign universities and organizations from the viewpoint of human resources development and actively

promoted the dispatch of staff members to Japan. As part of such training, the training participants have been obliged to prepare a cooperation promotion plan as part of the efforts to ensure the facilitation of exchanges with Japanese universities for many years. Based on these efforts, the exchanges between Hainan University and Japanese and other overseas universities have grown to a high level.

Mr. Li highly evaluates the Project as he believes that it has greatly contributed to establishing the foundations for Hainan University to become a university subject to the construction of world's first class courses.

3.4.2 Other Positive and Negative Impacts

(1) Impacts on the Natural Environment

No negative impacts on the natural environment were found by the ex-post evaluation. The environmental impact assessment (EIA) for the Project was carried out by the time of appraisal and was approved by the Bureau of Ecology and Environment in 2005, completing the necessary procedure for the implementation of the Project in China. During and after the Project, each university has conducted the necessary environmental monitoring of noise, dust, etc. as planned. Although there were concerns about the negative impacts of noise, dust, etc. on the natural environment, according to those stakeholders in this aspect at each university, all of the monitored values are within the standards set by the administration and no problems have been found.

(2) Resettlement and Land Acquisition

As the construction of buildings under the Project was conducted entirely on existing campuses, the Project did not necessitate any resettlement or land acquisition.

Based on the above, this Project has largely achieved its objectives. Therefore, the effectiveness and impacts of the Project are high.

3.5 Sustainability (Rating: ③)

3.5.1 Institutional/Organizational Aspect of Operation and Maintenance

The newly introduced facilities and equipment under the Project have been operated and maintained by each university under the supervision of the Provincial Ministry of Education which is the executing agency as planned at the time of appraisal. At each university, the new facilities and equipment are incorporated in the fixed assets and their operation and maintenance system has been developed in compliance with the maintenance fund management procedure for large equipment, bylaws for experiments and educational work, fixed assets management procedure, etc. which define

responsibilities and procedures. At those universities with a large number of equipment, a centralized management system is used to enhance the uniform, effective and efficient use of equipment. One such practice is the centralized installation and operation of important equipment, including that provided under the Project, at "a science experiment center" on the campus. The roles of the organizations involved are clearly defined and no problems are observed in regard to the staff strength required for the management and use of equipment.

3.5.2 Technical Aspect of Operation and Maintenance

At each university, maintenance inspection is periodically conducted. Repair work is entrusted to a supplier or suitable body when necessary and no special problems have occurred with the technical aspect of operation and maintenance.

Large test equipment and precision measuring instruments as well as analytical equipment are operated and maintained in an integral manner by full-time laboratory engineers, ensuring the necessary technical skills and standards. Each university displays the manual and important notes near individual equipment for easy recognition. Those teachers responsible for the operation and maintenance of precision equipment receive periodic technical training by the equipment manufacturers. Many positive cases have been observed by the ex-post evaluation, including "improvement of the operational skills due to the learning of know-how on the effective utilization of advanced equipment through training in Japan", "introduction of equipment operation training for graduate and post-graduate students to award an in-house operation qualification for those mastering the necessary equipment operation skills" and "efforts to deepen the contents of research by dispatching multiple teachers to the same Japanese universities to establish a continual relationship". The utilization rate of the newly introduced equipment is high. As wide-ranging research and education are conducted using such equipment, there are no issues concerning the technical capability of the target universities regarding the use of the equipment.

3.5.3 Financial Aspect of Operation and Maintenance

All of the target universities are controlled by the provincial government and their budgetary requirements are met by grants from the central and provincial governments (fiscal expenditure) and self-raised revenue, including tuition fees. According to the findings of the interview survey with individual universities, the financial assistance was gradually enhanced under the 11th Five Year Plan (2006 – 2010) and was further boosted under the 12th Five Year Plan (2011 – 2015). As shown in Table 17, the size of the provincial budget for education has continually increased since 2016, too. While the actual amount varies from one university to another, there has been a minimum of several million CNY a year provided by the central government. The financial support for the procurement

and maintenance of equipment at a large university amounts to 20 – 30 million CNY a year, including funding by the provincial government. The available financial data suggests the stability as well as increasing trend of both the provincial budget for education and the university budget. Reflecting such trend, the financial balance of each target university is favourable and each university has allocated a sufficient amount for equipment maintenance. None of the principal equipment procured under the Project is out of use for the reason of an insufficient operation or maintenance budget.

Table 17 Situation of Educational Expenditures of Hainan Province (Unit: million CNY)

	2016	2017	2018
University Education Expenditure	2,430	2,760	3,230
University Education Expenditure Index (2007=100)	380	432	505

Source: Statistical meterial of Hainan Province and replies to the questionnaire survey with the executing agency.

3.5.4 Current Status of Operation and Maintenance

At each university, all of the equipment introduced under the Project has been recorded in the equipment management ledger of the university for proper management. Expensive equipment is registered at the public platform run by the Provincial Agency of Science and Technology for its joint management by the provincial government and the university. The generally good conditions of the principal facilities and equipment are visually confirmed as well as by the records of use and inspection of each equipment. Some of the equipment of which the service life is short, such as PCs, are now facing a problem of deterioration but are still being continually used up to the present. There is a rule adopted by the universities that whenever an important equipment is used, the user records the equipment usage as well as its condition. Each university stated that the procurement and stocking of consumables do not pose any problems as long as they are still in production (only a limited number of consumables, etc. are no longer in production and their lack is sufficiently met by alternatives).

No major problems have been observed in the institutional/organizational, technical and financial aspects and current status of the operation and maintenance system. Therefore, the sustainability of the project effects is high.

４．Conclusions, Recommendations and Lessons Learned

4. 1 Conclusions

The Project was implemented to improve the education and research at a total of three universities in Hainan Province by means of constructing buildings, improving facilities and equipment and training teachers. The relevance of the Project is high as it is consistent with the policies of the Government of

China and Hainan Provincial Government for higher education resources, the development needs of China to achieve the quantitative and qualitative expansion of universities and Japan's ODA policy. As a positive effect of the Project, the quantitative and qualitative expansion of higher education at the target universities was achieved, including satisfactory improvement in terms of both the tangible and intangible aspects of higher education and a significant improvement of various educational indicators. The effectiveness and impacts of the Project are high as shown by the improved outputs of educational and research activities, making the best use of the advanced equipment and outcomes of training in Japan. Moreover, various efforts regarding local vitalization, environmental conservation, etc. have made progress through improved educational and research activities. In regard to the efficiency of the Project, although the outputs are believed to have been generally achieved as planned, the project cost exceeded the planned cost. Coupled with the substantial extension of the project period, the overall efficiency of the Project is judged to be low. The sustainability of the Project is high as there were no problems with the institutional, technical and financial aspects of the Project together with confirmation of the good operation and maintenance of the facilities and equipment. In the light of the above, the Project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to Executing Agencies

None

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

Importance of establishing the foundations for exchange, such as the signing of an exchange agreement to promote exchanges with Japanese universities

The establishment of the foundations for exchange, such as the signing of an exchange agreement between universities, is important to achieve active exchanges between Japan and a recipient country after the completion of an ODA or ODA loan project. It is therefore essential to implement efforts designed to achieve such development, including the introduction of successful cases of continuing and expanding exchanges, during the project period. The importance of such an agreement must be noted as Japan-China cooperation is moving from ODA to private sector-based cooperation.

The planned training under the Project was implemented relatively smoothly at each target university but the subsequent exchange performance with Japanese universities varies from one university to another. One university which adopted proactive policies to promote cooperation such as ① making it

compulsory for the training participants to prepare a post-training cooperation promotion plan and ② the dispatch of multiple teachers to the same Japanese universities and faculties, has been successful in concluding cooperation agreements with multiple Japanese universities. At the time of ex-post evaluation, various types of cooperation with Japanese universities are taking place. In contrast, a university which did not make active efforts for future inter-university exchanges at the implementation stage of the Project has not produced sufficient results. In short, a university which has fully recognized the importance of exchanges with overseas universities, etc. and has strategically utilized the ODA loan has produced sufficient outcomes while a university which has simply focused on participation on training has experienced only the limited effect of promoted exchanges between Japanese and Chinese universities.

Comparison of the Original and Actual Scope of the Project

Item	Planned	Actual
1. Project Outputs	Targets: 4 universities in Hainan Province	Targets: As planned (South China University of Tropical Agriculture was merged with Hainan University)
(a) Improvement of Tangible Aspect (Hard Component)		
i) Construction of Buildings, etc.	Hainan University: 7 buildings, 84,000 m^2 South China University of Tropical Agriculture: 1 building, 17,000 m^2	Hainan University: 5 buildings, 123,413 m^2 Changed due to merger with Hainan University
ii) Improvement of Educational Equipment	84 items 1) civil and mechanical engineering; 2) analytical equipment; 3) life science equipment; 4) material chemistry equipment; 5) medical equipment; 6) astronomical equipment	80 items Contents are as planned (The procurement of IT equipment by the ODA loan was cancelled.)
(b) Improvement of Intangible Aspect (Soft Component: Training in Japan)	123 persons (International finance, mechanical engineering, business management and medical science, etc.)	191 persons (University management, mechanical engineering, environment, business management and medical science, etc.)
2. Project Period	June, 2006 – March, 2011 (58 months)	June, 2006 – June, 2016 (121 months)
3. Project Cost Foreign Currency Portion Local Currency Portion Total ODA Loan Portion Exchange Rate	 3,455 million yen 1,297million yen (94.7 million CNY) 4,752 million yen 3,150 million yen 1 CNY = 13.7 JPY (as of September, 2005)	 3,336 million yen 3,770 million yen (249.7 million CNY) 7,106 million yen 3,009 million yen 1 CNY = 15.1 JPY (mean for 2006 through 2016)
4) Final Disbursement	December, 2013	