People's Republic of China

FY2015 Ex-Post Evaluation of Japanese ODA Loan Project

"Inland Higher Education Project (Regional Vitalization, Market Economy Reform Support, and Environmental Conservation) (Guangxi Autonomous Region, Jiangxi Province, Hubei Province and Shanxi Province)"

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

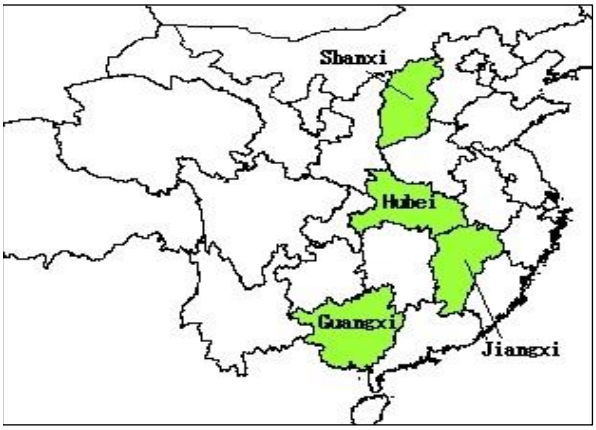
0. Summary

The Project[1] was implemented for the purpose of improving education and research at a total of 38 universities in Guangxi, Jiangxi, Hubei and Shanxi Provinces (hereinafter referred to as "the subject provinces") in China through the improvement of relevant facilities and equipment and the training of teachers. Relevance of the Project was evaluated to be high, as it was consistent with (i) the higher education policies of China and the subject provinces, (ii) the development needs for quantitative and qualitative enhancement of the universities, and (iii) Japan's assistance policies. While the actual effects of the Project were somewhat hampered by the delayed installment of some educational and research equipment, the tangible (hard component) and intangible (soft component) needs were met. Quantitative and qualitative improvements of the higher education at the targeted universities were achieved, as evidenced by the significant increases in the various indicators for education. The high level of effectiveness and the impacts of the Project were also substantiated by the improved outcomes of educational and research activities, making the best use of the advanced equipment and training; and the advancements in the various initiatives designed to achieve regional vitalization, environmental conservation, etc. Efficiency of the Project was evaluated to be fair on the whole: although the Project cost was within the plan, the Project period exceeded the planned period due to delays in procurement. Sustainability was evaluated to be high, with no issues observed in institutional, technical and financial aspects, and the operation and maintenance of the facilities and equipment developed by the Project were in good status.

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

[1] Although this evaluation deals with four separate projects implemented in four different provinces under the Inland Higher Education Project, they are collectively referred to as "the Project" in this report.

1. Project Description



Project Locations

Teaching in progress using equipment procured under the Project
(Huanggang Normal College : Hubei)

1.1 Background

In China, together with the remarkable economic development, several development challenges have arisen such as the narrowing internal disparity between coastal and inland areas, reducing poverty, preparing to join the World Trade Organization (WTO) and taking part in global issues. To deal with these challenges, the Chinese government put a high priority on the development of human resources that were essential for the accelerated efforts towards developing a market economy and narrowing economic gaps under the policy to strengthen reform and promote openness. Accordingly, the government set out a target to increase the higher education enrollment ratio to 15% and to adopt a policy to strengthen higher education institutions in inland areas. The basic indicators for the subject provinces are shown in Table 1 below.

Table 1: Basic indicators for the subject provinces

	Guangxi(2001)	Jiangxi(2002)	Hubei(2002)	Shanxi (2002)
Population	47.88 million	42.22 million	59.87 million	32.95 million
GDP per capita	4,668 yuan	5,828 yuan	8,309 yuan	5,571 yuan
Higher education enrollment rate	8%	14%	18%	15%
Number of higher education institutions	41	48	75	39

Sources: JICA appraisal documents.

Apart from Hubei Province, GDP per capita in the other three subject provinces is significantly lower than the national average (8,670 yuan in 2001 and 9,465 yuan in 2002). The higher education enrollment rate in the subject provinces—except for Guangxi

Province—was higher than the national average (13.3%) but there was still a need to strengthen higher education in all of the subject provinces. The 10th Five Year Plan (2001 – 2005) for each province called for the promotion of a market economy and further economic growth while the 10th Five Year Plan for Education (2001 – 2005) called for improvement of the higher education enrollment rate and an increase of the number of students in higher education to reach human development targets. There was recognition of the need to improve the hard aspect (new teaching facilities and equipment) as well as the soft aspect (teacher training) in addition to breaking free from the financial constraints.

Under these circumstances, the Project identified the development themes for Guangxi, Jiangxi, Hubei and Shanxi Provinces to be (i) regional vitalization, (ii) strengthening of the market rules and (iii) environmental conservation. The Project aimed to improve the quality and quantity of higher education at major universities in the subject provinces to contribute to the fostering of human resources capable of dealing with the identified development themes.[2]

1.2 Project Outline

The objective of the Project was to quantitatively and qualitatively enhance higher education at major universities in the subject provinces by developing educational infrastructures such as buildings and equipment (improvement of the hard aspects) and training teachers (strengthening of the soft aspects), thereby contributing to regional vitalization, strengthening of market economy reform, and environmental conservation of the subject provinces.

The targeted universities in the subject provinces are listed in the following table.

[2] This ex-post evaluation features the work conducted in Guangxi, Jiangxi, Hubei and Shanxi Provinces as part of the Japanese ODA loan project entitled “Inland Higher Education Project” targeting 22 inland provinces, municipalities and autonomous regions in China.

Table 2: Targeted universities of the Project

	Universities
Guangxi	Guangxi Normal University, Guilin University of Electronic Technology, Guangxi University of Chinese Medicine, Guangxi Teachers Education University, Guilin Medical University, Guilin University of Technology, Youjiang Medical University for Nationalities, Yulin Normal University, Guangxi University of Science and Technology and Guangxi Open University (10 Universities)
Jiangxi	Nanchang University, Jiangxi Normal University, Jiangxi Agricultural University, Jiangxi University of Finance and Economics, East China Jiaotong University, Gannan Normal University, Shangrao Normal University, Yichun University and Jiangxi University of Traditional Chinese Medicine (9 Universities)
Hubei	Hubei University, Wuhan University of Science and Technology, China Tree Gorges University, Hubei University of Technology, Yangtze University, Wuhan Textile University, Wuhan Polytechnic University, Huanggang Normal College, Wuhan Institute Of Technology, Hubei University For Nationalities, Hubei University of Arts and Science and Hubei University of Traditional Chinese Medicine (12 Universities)
Shanxi	Taiyuan University of Technology, Shanxi University, Shanxidatong University, Shanxi Normal University, Shanxi Medical University, ShanXi Agricultural University and Shanxi Vocational College of Tourism (7 Universities)

Sources: Responses to the questionnaire from the executing agency.

Note: The university names are those at the time of the ex-post evaluation. The Shanxi Vocational College of Tourism (targeted college for the ODA Loan Project) became an independent college from Shangxi University of Finance and Economics.

Province	Guangxi	Jiangxi	Hubei	Shanxi
Loan Approved Amount/Disbursed Amount	4,606million yen / 4,093million yen	4,872million yen / 4,517million yen	5,097million yen / 4,017million yen	5,093million yen / 5,000million yen
Exchange of Notes Date/Loan Agreement Signing Date	March 2003 / March 2003	March 2004 / March 2004	March 2004 / March 2004	March 2004 / March 2004
Terms and Conditions	Interest Rate 0.75% (2.2% for training component) Repayment Period (Grace Period) 30 years (40 years for training component) (10 years) Conditions for Procurement: General untied	Interest Rate 0.75% (1.5% for training component) Repayment Period (Grace Period) 30 years (40 years for training component) (10 years) Conditions for Procurement: General untied	Interest Rate 0.75% (1.5% for training component) Repayment Period (Grace Period) 30 years (40 years for training component) (10 years) Conditions for Procurement: General untied	Interest Rate 0.75% (1.5% for training component) Repayment Period (Grace Period) 30 years (40 years for training component) (10 years) Conditions for Procurement: General untied
Borrower /Executing Agency	The government of People's Republic of China / Guangxi Autonomous Region People's Government	The government of People's Republic of China /Jiangxi Provincial People's Government	The government of People's Republic of China /Hubei Provincial People's Government	The government of People's Republic of China /Shanxi Provincial People's Government
Final Disbursement Date	July 2013	August 2013	August 2013	August 2013
Main Contract	-	-	-	-
Main Consultant	-	-	-	-
Feasibility Studies, etc.	F/S by the School of Design and Research, Guangxi University (May,2002)	F/S by the Nanchang Engineering and Research Institute of Nonferrous Metals (July, 2003)	F/S by Hubei Province Engineering Consulting Company (May, 2003)	F/S by Shanxi Province Engineering Consulting Company (May, 2003)
	- "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	-	-	-	-

2. Outline of the Evaluation Study

2.1 External Evaluator

Toshihiro Nishino, International Development Center of Japan Inc.

2.2 Duration of Evaluation Study

Duration of the Study: August 2015 – January 2017

Duration of the Field Study: November 15 – December 12, 2015 and March 6 - 19, 2016

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

3.1 Relevance (Rating: ③[4])

3.1.1 Relevance to the Development Plan of China

The objective of the Project is consistent with the five-year plans for economic and social development and the five-year plans for the education sector at both the national and provincial levels, as well as with other education-related development strategies, which all aim for quantitative and qualitative development of higher education both at the times of appraisal and ex-post evaluations of the Project. At the national level, there has been continuous emphasis to foster and expand core universities in the Midwestern part of China, and the relevant projects, such as "the Project for the Promotion of Higher Education in the Midwestern Part (2012–2015)," have been implemented. Although there have not been major policy changes between the appraisal stage and the ex-post evaluation stage, the 13th Five Year Plan (2016–2020) includes the policy of "steadily maintaining the scale of higher education while seeking substantial development". There appears to be an emphasis on the qualitative improvement of higher education in the coming years from the viewpoint of "seeking to develop highly capable human resources to match the social needs".

[3] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[4] ③: High, ② Fair, ① Low

Table 3: Main objectives of development plans related to the Project

Type of document	At the time of appraisal	At the time of ex-post evaluation
National level development plan	The 10th 5-year Plan for National Economic and Social Development (2001–2005): To increase higher education enrollment ratio to around 15% by 2005.	The 12th 5-year Plan for National Economic and Social Development (2011-2015): To emphasize higher education for promoting industrial advances (quantitative targets include 87% of junior secondary graduates to go on to senior secondary school)
National level education sector plan	The 10th National 5-year Plan for Education (2001-2005): To increase student enrollment in HEIs (higher education institutions) to 16,000,000 by 2005; to develop human resources that have high skills in high technology, biotechnologies, manufacturing technologies etc. that are necessary for industrial structural adjustment; to strengthen support to HEIs that are relatively at a high level in western area; to strengthen support to fostering of teachers.	The 12th National 5-year Plan for Education (2011-2015) and National Mid- and Long-term Reform and Development Plan for Education Sector"(2010–2020): To increase higher education enrollment ratio from 26.5% in 2010 to 40% in 2020; to increase student enrollment in HEIs from 29,790,000 in 2009 to 33,500,000 by 2015; to develop HEIs in Midwestern area with special focus on development of departments that are competitive and fostering of teachers.
Provincial Level Education Development Plan	Provincial 10th Five Year Plan for Education (2001 – 2005) (Guangxi) • Higher education enrollment rate: 12% • Number of students in higher education: some 550,000 (Jiangxi) • Higher education enrollment rate: 18.5% • Number of students in higher education: some 450,000 (Hubei) • Higher education enrollment rate: 23% • Number of students in higher education: some 1.4 million (Shanxi) • Higher education enrollment rate: 20% • Number of students in higher education: some 300,000	Provincial 12th Five Year Plan for Education (2011 – 2015) (Guangxi) • Higher education enrollment rate: 28% • Number of students in higher education: some 900,000 (Jiangxi) • Higher education enrollment rate: 36% • Number of students in higher education: some 1.25 million (Hubei) • Higher education enrollment rate: 40% • Number of students in higher education: some 1.84 million (Shanxi) • Higher education enrollment rate: 38% • Number of students in higher education: some 690,000

Sources: JICA appraisal documents; respective documents of the mentioned development plans.

3.1.2 Relevance to the Development Needs of China

Development needs were observed for the quantitative and qualitative enhancement of education at the thirty eight targeted universities during both the appraisal and ex-post evaluation.

At the appraisal stage, the future need for the quantitative expansion of higher education was predicted (i) in line with the further expansion of primary and secondary education and (ii) to narrow the economic disparity between coastal and inland areas as mentioned in 1.1 – Background. The projected demand suggests an approximate double the number of students in higher education in five years (Table 4), and the central government made a request to local higher education institutions to make hard, (expansion of classroom facilities and equipment) as well as soft (teacher training) improvements. However, the

universities targeted by the Project and controlled by each provincial government were experiencing a complete lack of funds, as evidenced by the fact that all of the universities responded to an interview survey with the statement that "at the start of the Project, financial assistance was quite limited and the introduction or renewal of educational equipment was especially low".[5]

Table 4: Projected demand for higher education

	Guangxi	Jiangxi	Hubei	Shanxi	Total
Actual number of students in higher education	288,000 (2001)	409,000 (2002)	1,040,000 (2002)	208,000 (2002)	1,945,000
Projected demand	555,000 (2006)	1,207,000 (2007)	1,600,000 (2007)	400,000 (2007)	3,762,000

Sources: JICA appraisal documents.

At the time of the ex-post evaluation, GDP per capita was still below the national average (49,754 yuan) in all of the subject provinces. According to the findings of an interview survey with the education bureaus of the subject provinces and senior staff members as well as those in charge of project implementation at the targeted universities, it is still necessary to further promote "the strengthening of market rules" and to maintain economic growth and eradicate the economic disparity with coastal regions through "vitalization of regional economy". Meanwhile, "environmental conservation" has become the primary target for human resources development and enhancement at each university in the face of increasing need. The number of students in higher education has steadily increased in each of the subject provinces, and there is a strong need for quantitative and qualitative improvement of higher education institutions. In the coming years, the simple expansion of the scale of higher education will likely become less important in some provinces because of (i) the successful quantitative expansion of higher education in the 12th Five Year Plan period and (ii) the growing demand for highly capable human resources at the post-graduate level due to the enhancement of China's economic and industrial level. However, in Guangxi and other provinces, there is still an emphasis on the quantitative expansion in light of the lower higher education enrollment rate compared to the national average.

Although the contents of the Project during its request stage were limited to the improvement of facilities and equipment (i.e. the hard aspect), the soft component (teacher training) was subsequently added following consultations between Japan and China. The findings of the interview survey with senior staff members and those in charge of project

[5] Funding sources for universities in China consist of grants from the central and provincial governments and self-funding sources, including tuition fees.

implementation at the targeted universities reveal that all of the targeted universities were initially interested in improving the facilities and equipment because of their insufficient availability. Subsequently, however, they were aware of the essential need for the qualitative improvement of higher education through human resources development, etc. from the viewpoint of (i) improving the education and research level and (ii) promoting the structural reform of the university. By the time of the ex-post evaluation stage, the need to improve the soft aspect was further increased. Accordingly, the inclusion of the soft component in the Project to facilitate human resources development was highly appropriate as it reflected the long-term need for further development of higher education institutions in China.[6]

3.1.3 Relevance to Japan's ODA Policy

At the time of the appraisal, Japan's Country Assistance Policy for China, the Medium-term Strategy for Overseas Economic Cooperation Operations (JICA 2002) and the Country Assistance Strategy (JICA 2002) put priorities on human resources development from the viewpoint of supporting openness and reform and post-WTO economic reform, and on assistance in inland China from the perspective of narrowing the economic gap. The Project objective was consistent with these aid policies of Japan. The Country Assistance Strategy upholds "regional vitalization and exchange", "strengthening of market economy reform", and "environmental conservation" as key areas of human resource development.

The Project has been highly relevant to China's development plans, development needs, as well as to Japan's ODA policies. Therefore, its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

The actual production of the outputs is summarized in "Comparison of the Original and Actual Scope of the Project" of the final page of this report. In regard to the hard component, the original plan to use Japanese ODA loan for the construction of facilities in Hubei Province was changed and constructed through the domestic funds. As the saved amount of ODA loan was then used for the procurement of educational and research equipment, the actual number of procured educational and research equipment increased from the original plan despite the partial cancellation of the equipment procurement. The procurement of these equipment under the Project was conducted in several product

[6] However, it was not necessarily easy for some provinces to secure host higher education institutions for the long-term dispatch of their teachers for training in Japan, which will be in greater detail in the section dealing with the efficiency of the Project. This situation suggests that it was necessary to accurately grasp the actual local needs for training.

specific packages. Because of the prolonged procurement period, there were frequent (i) changes in equipment specifications (including discontinued production of some products)[7] and (ii) cancellation, minor changes and adjustments of the equipment reflecting the changing needs of individual universities.[8] Regarding facility construction, there were no major changes from the original plan even though some minor changes were made to the contents of the work and building areas based on the needs of individual universities. In short, it is safe to conclude that the hard outputs were generally achieved as planned.

[7] In regard to updating the specifications necessitated by the lengthening of the project period, the specifications were adjusted or changed prior to the tender. In some cases, it took a long time for the actual delivery, and senior staff members and those in charge of project implementation of several universities pointed out that some of the procured equipment was not necessary of the latest model.Nevertheless, all of the procured equipment has been actively used for research and education, and no problems with their use have occurred.

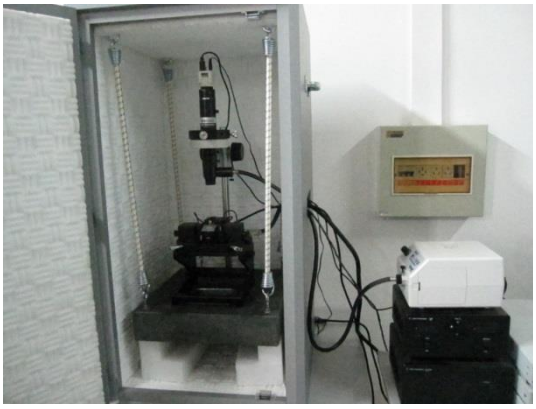
[8] Funds saved as a result of the tender for early packages under the Project and funds for cancelled packages were subsequently passed on to later packages after undergoing the official procedure within the approved loan amount.

Table 5: Changes of the Outputs (Hard Component)

	Construction of Facilities	Educational and Research Equipment
Ghangxi	• The department to use the new facility was changed at one university. • The construction site was changed for one university (a new campus). • The overall building area was increased in nine universities and decreased in one university.	• Following the extension of the procurement period, minor changes were made to the specifications and types of equipment to be procured. (The procurement method was changed to university-specific packaged procurement).
Jiangxi	• The overall building area was increased in five universities and decreased in two universities	• Following the extension of the procurement period, minor changes were made to the specifications and types of equipment to be procured. • One package was cancelled.
Hubei	• The construction work was cancelled in two universities because of a change in required facilities • The contents and purpose of the construction were changed in one university. • The overall building area was increased in five universities and decreased in three universities. • (The funding source was changed to domestic funds.)	• Following the extension of the procurement period, minor changes were made to the specifications and types of equipment to be procured. • Three packages were cancelled (the funds for the cancelled packages were used for other packages) (Phase 1 procurement). • The diversion of part of the ODA loan for construction work to the Phase 2 procurement meant an increased scale of procurement of educational and research equipment (Phase 2 procurement). • During the Phase 2 procurement period, the delivery of some of the planned equipment (worth ¥707 million) was cancelled after signing of the contract due to a strong yen and other factors. (For the Phase 2 procurement, the procurement method was changed to university-specific packaged procurement).
Shanxi	• The contents and purpose of construction were changed in two universities. • The overall building area was increased in four universities and decreased in one university. • (The civil engineering work procurement method was changed to domestic competitive bidding.)	• Following the extension of the procurement period, minor changes were made to the specifications and types of equipment to be procured. • Two packages were cancelled while three new packages were added.

Sources: Responses to the questionnaire from the executing agency.

Piano procured under the Project
(Gannan Normal University : Jiangxi)



Microscope procured under the Project
(Wuhan University of Science and Technology : Hubei)

Classroom building constructed
under the Project
(Shanxi University)

Library building constructed
under the Project
(Guilin Medical University : Guangxi)

As part of the Project, the training of teachers of the targeted universities in Japan (in principle, individual universities and teachers hoping to undergo such training select the host universities and tutors (professors) and make individual arrangements for their training) was conducted under the soft component. The actual outputs of this training are shown in Table 6.

Table 6: Actual training outputs

	Planned (persons)	Actual output			Actual-Planned ratio	
		Total	Long-term specialist training	Short-term manager training	Total	Long-term specialist training
Guangxi	149	195	114	81	131%	77%
Jiangxi	150	349	64	285	233%	43%
Hubei	158	162	74	88	103%	47%
Shanxi	216	345	210	135	160%	97%

Sources: Responses to the questionnaire from the executing agency.

Note: "Long-term specialist training" is training where teachers in specialist fields are individually dispatched to host universities in Japan for a long period of time (long-term training of more than one year in a specialist field), while "short-term manager training" usually lasts for less than one month.

The actual output in terms of the number of trainees exceeded the planned number in all four provinces. However, regarding "the long-term dispatch of individual teachers with specialist knowledge of the relevant disciplines to Japanese universities (long-term training of one year or longer in their own specialist fields)" as planned at the appraisal stage, the planned output was almost achieved only in Shanxi Province. In the other three provinces, however, the achievement rate was 77% for Ghangxi Province and was below 50% for Jiangxi and Hubei Provinces. These low achievement rates can be attributed to the large number of participants enrolled in short-term training courses (normally less than one month) where manager training (to learn how to manage a university) is the dominant course. Several factors have contributed to the failure of many provinces to achieve the target for long-term specialist training, as listed below.

Factors applicable to almost all of the target universities

- As teachers hoping to undergo training searched for suitable Japanese universities on the Internet or through an introduction by an acquaintance, there were cases of mismatching, especially for universities with little experience of exchange with foreign universities (see Box 1).
- Some of the targeted universities were in the midst of expansion and had no leeway to dispatch their teachers abroad for a long period of time (especially universities in Jiangxi Province).

Factors applicable to some of the targeted universities

- In Jiangxi Province, the Provincial Education Bureau emphasizes and utilizes manager training, and the targeted universities also showed the same tendency to emphasize such training. (At some universities, the opportunity to train in Japan was not fully publicized.)
- The number of eligible Chinese teachers was limited due to language problems (lack of English proficiency).

- At the initial stage of recruitment, there was a misconception that Japanese proficiency was essential, impairing the application prospects.
- Training in Japan was less attractive because of "a noticeable preference for training in Europe or the United States", "existence of numerous options for study abroad or overseas training," amongst other reasons.
- The Great East Japan Earthquake in 2011 fostered a mood of staying away from Japan in the subsequent years.

Meanwhile, universities and their teachers in Guangxi and Shanxi Provinces expressed a strong desire for overseas training for human resources development under the Project, and local universities adopted measures such as "the active assistance of departments for teachers to find suitable universities in Japan for training" and "provision of language training for teachers hoping to apply for training in Japan". In Guangxi Province, the Provincial Education Bureau actively assisted the matching of local universities with few overseas networks, and this proactive stance bore fruit.

Short-term training courses that predominantly feature manager training were promoted through consultations and agreement between JICA and the Chinese side, taking into account the difficulty of matching and other factors hindering the full achievement of the long-term training objectives. As the contents of these short-term training courses were important for universities facing the needs to proceed with scale expansion and structural reform, their implementation was justified. Nevertheless, the manager training course should serve to complement long-term specialist training, and the actual outputs of the implemented manager training were not realized necessarily as planned.[9]

[9] There were universities, especially in Jiangxi Province, which sent dozens of staff members to manager training. It can now be observed at some of these universities that many of those that underwent manager training had already left their positions by the time of the ex-post evaluation.

Box 1: JICA's assistance for training applicants to secure places for training and outcomes

The importance of matching to ensure the number of trainees as planned was recognized at a relatively early stage of the Inland Higher Education Project, and JICA made various efforts to ensure good matching.[10] As a result of these efforts, the necessary foundations to ensure smooth matching were established. The beneficiaries survey[11] for the ex-post evaluation found that 31% and 64% of the respondents selected the answers "very appropriate" and "appropriate" respectively to the question of "Was the matching to find a place for training conducted appropriately?" This indicates that the matching process was highly evaluated by an overwhelming majority. However, according to the interview survey with senior staff members and persons in charge of project implementation at the targeted universities, there were some teachers that abandoned their training applications because they could not find locations for training. This indicates that some applicants did not experience smooth matching of programs.

From the viewpoint of training applicants, it was important to find a place (tutor) for training that matched his/her specialist discipline. In many of the targeted universities, the search for a matching place was left to the applicants themselves,[12] and it was particularly difficult for applicants without an overseas network or vital information due to their little experience of international exchange or activities abroad. Information provided by JICA on Japanese universities must have been effective to a certain extent but was not necessarily sufficient, especially for teachers in scientific disciplines of which their specialist fields tend to be highly segmented. JICA's assistance was primarily directed towards individual universities. The interview survey found a strong need for JICA to provide more detailed assistance, including focused advice, for individual applicants. Meanwhile, the beneficiaries survey found that only 9% of applicants used "information provided by JICA" to find a possible place for training in Japan.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total project cost by province was 5,407 million yen (90% of the planned cost) for Guangxi Province, 7,807 million yen (92% of the planned cost) for Jiangxi Province, 8,843

[10] To be more precise, these efforts included ① convening of a briefing targeting Japanese universities to accept trainees and Chinese universities to participate in the Project, ② preparation of a pamphlet explaining the Project, ③ convening of a meeting for Japanese and Chinese universities to facilitate matching, ④ simplification of the procedure for trainees to enter Japan through consultations with Japan's Immigration Bureau, ⑤ construction of a website for the Project, formulation of guidelines regarding how to find accepting Japanese universities, a template for e-mails to be sent to Japanese universities and other relevant matters and the preparation as well as distribution of information materials on Japanese universities and ⑥ assistance for matching using the SAPI (Special Assistance for Project Implementation) facility.

[11] The beneficiaries survey conducted as part of the ex-post evaluation is outlined here. (Target) Participants for training in Japan; (Method) Request to each university via the provincial education bureau to make former trainees reply to the questionnaire (the selection of subject former trainees to reply to the questionnaire was left to each province and university because of the difficulty of conducting random sampling using a list); (Number of questionnaires sent) 201; (Number of valid responses) 201 (by province, 50 each for Guangxi, Jiangxi and Hubei Provinces and 51 for Shanxi Province) (by subject, 64 for humanities courses, 84 for science courses and 53 for the manager course) (by duration (for only humanities and science courses), 60 for long-term (one year or longer) and 88 for short term (less than one year); (by gender, 85 females and 116 males); (Principal questions) ① How was a training place found, ② Adequacy of matching, ③ Degree of satisfaction with training and ④ Degree of deepened knowledge of Japan.

[12] The most common responses to the question "How did you find a place for training?" in the beneficiaries survey conducted among the participants of the specialist training courses were ① "the Internet" (46%) and ② "introduction by a friend or acquaintance" (39%) (multiple answers permitted). This result suggests that the applicants were generally expected to find training places by themselves.

million yen (102% of the planned cost) for Hubei Province and 7,617 million yen (93% of the planned cost) for Shanxi Province as shown in Table 7. The actual cost was, therefore, lower than planned for three of the provinces. The reason for the actual cost exceeding the planned cost in Hubei Province was the expansion of the project scale due to an increase in educational and research equipment. All of the planned buildings were funded by the Government of Hubei Province, and the ODA loan originally earmarked for these buildings was totally diverted to the procurement of additional educational and research equipment to increase the project scale. As such, the over-run of the project cost is deemed to have been appropriate for the increased project scale.

Table 7: Planned and actual project costs

Unit: million yen

		Plan (appraisal)			Actual		
		Foreign currency	Local currency	Total	Foreign currency	Local currency	Total
Guangxi	1.Building construction	1,854	1,349	3,202	1,870	1,314	3,184
	2. Equipment	2,283	0	2,283	2,051	0	2,051
	3. Training	172	0	172	172	0	172
	4.Price contingency	78	3	81	0	0	0
	5.Physical contingency	219	67	287	0	0	0
	Total	4,606	1,419	6,025	4,093	1,314	5,407
Jiangxi	1.Building construction	0	3,432	3,424	0	3,290	3,290
	2. Equipment	4,301	0	4,301	4,334	0	4,334
	3. Training	244	0	244	183	0	183
	4.Price contingency	94	0	94	0	0	0
	5.Physical contingency	233	172	405	0	0	0
	Total	4,872	3,604	8,476	4,517	3,290	7,807
Hubei	1.Building construction	1,709	2,471	4,180	0	3,902	3,902
	2. Equipment	2,824	924	3,748	3,849	924	4,773
	3. Training	243	0	243	168	0	168
	4.Price contingency	78	1	79	0	0	0
	5.Physical contingency	243	171	413	0	0	0
	Total	5,097	3,566	8,663	4,017	4,826	8,843
Shanxi	1.Building construction	1,430	2,341	3,771	1,430	2,617	4,047
	2. Equipment	3,118	551	3,669	3,386	0	3,386
	3. Training	215	17	232	184	0	184
	4.Price contingency	87	3	90	0	0	0
	5.Physical contingency	243	145	389	0	0	0
	Total	5,093	3,057	8,151	5,000	2,617	7,617

Sources: JICA appraisal documents, responses to the questionnaire from the executing agency.
Notes

1) At the time of this ex-post evaluation, while no contractual settlement has officially been made in regard to the refund of the unused ODA loan of 707 million yen in the Phase 2 funding for educational and research equipment in Hubei Province, this amount is subtracted here from the actual cost because this refund is likely to be made in the near future based on the signing of the relevant L/A.
2) The exchange rate (yen to yuan) used was 15 yen for the planned cost for Guangxi Province and 14.3 yen for the planned cost for Jiangxi, Hubei and Shanxi Provinces. In comparison, the exchange rate used for the actual cost was 13.9 yen for Jiangxi Province (average exchange rate during the project period from 2003 to 2013), 14.3 yen for Jiangxi Province (between 2002 and

2014), 14.9 yen for Hubei Province (between 2004 and 2015) and 14.1 yen for Shanxi Province (between 2004 and 2013).

3.2.2.2 Project Period

As shown below in Table 8, the actual project period was significantly longer than the planned period at the time of appraisal in all of the provinces (ratio against plan: 315% for Guangxi Province, 182% for Jiangxi Province, 231% for Hubei Province and 185% for Shanxi Province).

Table 8: Planned and actual project periods

		Plan (appraisal)	Actual
Guangxi	Signing of Loan Agreement	March 2003	March 31, 2003
	Project period	January 2003 - March 2006 (39 months)	April 2003 - June 2013 (123 months)
	Building construction	January 2003 - March 2005	August 2005 - April 2011
	Procurement of equipment	April 2003 - December 2005	August 2005 - June 2013
	Training	October 2003 - March 2006	September 2004 - December 2011
Jiangxi	Signing of Loan Agreement	March 2004	March 31, 2004
	Project period	May 2002 - March 2009 (83 months)	May 2002 - November 2014 (151 months)
	Building construction	May 2002 - May 2005	May 2002 - May 2005
	Procurement of equipment	May 2004 - October 2006	November 2006 - November 2014
	Training	July 2004 - March 2009	July 2005 - November 2009
Hubei	Signing of Loan Agreement	March 2004	March 31, 2004
	Project period	April 2004 - March 2009 (61 months)	April 2004 - December 2015 (141 months)
	Building construction	April 2004 - December 2005	April 2004 December 2015
	Procurement of equipment	April 2004 - March 2007	January 2009 - December 2015
	Training	April 2004 - March 2009	January 2007 - December 2012
Shanxi	Signing of Loan Agreement	March 2004	March 31, 2004
	Project period	April 2004 - March 2009 (61 months)	April 2004 - August 2013 (113 months)
	Building construction	April 2004 - December 2006	December 2006 - August 2013
	Procurement of equipment	April 2004 - March 2007	December 2006 - August 2013
	Training	April 2004 - March 2009	December 2006 - August 2013

Sources: JICA appraisal documents, responses to the questionnaire from the executing agency.
Note: In cases where part of the Project commenced using local funds prior to the signing of the loan agreement, the time of project commencement was before the date of signing.

The main cause of the massive over-run of the project period was the delayed procurement of educational and research equipment. This delay was observed in almost all of the provinces and universities. The principal reasons for the delay are listed below.

Delay prior to tender	Central level	• The approval and modification procedures relating to procurement under an international cooperation project were strictly monitored at the central government level, and these procedures took much longer to complete than originally planned.
	Provincial and university levels	• The Chinese organizations and universities were unaccustomed to procurement work under an international cooperation project, especially at the initial stage of the Project. • Because educational and research equipment was packaged by product type, etc. for all of the universities, the delay in procurement procedure at some universities affected the entire procurement procedure (Contrary to the original plan, some universities expressed the desire to procure equipment after facility construction; the necessary work to complete the procurement was delayed at these universities.). • As a result of the delay described above, it became necessary to make additional adjustments, such as (i) the procurement of some equipment by the recipient's own funds and (ii) the specifications of the equipment to be procured as a package became obsolete during the delay. Such situation further delayed the procurement completion. • Although efforts were made to change to the university-specific packages for easier adjustment, the agencies responsible for procurement in some provinces were reluctant to change the procurement method: they aimed to follow the original procurement plan and to preserve the original packages.
Delay after tender		• Because the contents of each package were diverse, it took a long time for the successful bidder to procure all equipment from various suppliers for final delivery. In the case of some equipment, it was discovered after the tender that production had been terminated, necessitating extra time to adjust to the situation. • In the international competitive tender held, the lowest bidder was the successful bidder. However, some successful bidders demanded a lower contract price and a change in some of the specifications after the closure of the tender, and some time was required to persuade them to keep to their bids. (These problems were especially evident in the Phase 2 tender in Hubei Province where the opening of the tender occurred when the yen was weak, and the profit margin of the successful bidder was badly hit by the subsequent change of the exchange rate.)

The construction of facilities was also delayed at some universities because of ① the delayed commencement of procurement in some provinces, as the implementing organization was unfamiliar with Japan's ODA loan projects, ② change in the procurement method, including the change to local procurement, ③ adverse impacts of flooding and other natural disasters and ④ lengthy process of approval and adjustment by a provincial government regarding a new campus construction plan. Compared to the procurement of educational and research equipment, the actual delay of the construction work was much

shorter.

3.2.3 Results of Calculations of Internal Rates of Return

Due to the nature of the Project, a quantitative analysis of the internal rate of return was not conducted.

Although the Project cost was within the plan, the Project period exceeded the plan. Therefore, the efficiency of the Project is fair.

3.3 Effectiveness[13] (Rating: ③)

The effectiveness of the Project was analyzed from two aspects: the quantitative aspect, including the performance of indicators for operational effectiveness as determined at the appraisal stage; and the qualitative aspect regarding the qualitative improvement of education and research.

3.3.1 Quantitative Effects (Operation and Effect Indicators)

The target year for the achievement of the quantitative indicators was set as the planned completion year of the Project. Yet, because the latest data obtainable for this ex-post evaluation was that of 2014 for all provinces, the 2014 data is used as the actual performance in the target year in the present analysis.

(1) Quantitative expansion of teaching and research

At the appraisal stage, “the number of students”, “the total building area of the school buildings” and “the total monetary value of the educational and research equipment” were set as indicators for the improvement of education and research. As shown in the following tables, all provinces demonstrated substantial improvements for each indicator. The facilities and equipment developed under the Project were mostly utilized, and it can be said that they played an important role in the quantitative expansion of teaching and research.

Firstly, there was a substantial increase in the number of students at each of the targeted universities. Although the actual number at the original target year for completion did not reach the target number in all provinces (56,000 short of the target altogether in four provinces), this figure was compiled at a time when the construction work to accommodate incoming students was still incomplete. The total number of students in the four provinces increased by 189,000 in approximately five years from the year of appraisal to the original target year (the actual number of students in the original target year for the four provinces was 623,000, an increase of some 44% from the year of appraisal). By province, the rate of

[13] Sub-rating for Effectiveness was given with consideration of Impact.

increase was 44% for Guangxi, 68% for Jiangxi, 35% for Hubei and 27% for Shanxi. This upward trend in the number of students continued, reaching 879,000 (total for four provinces) in 2014 after the completion of the Project, which was 2.03 times the number of students (434,000) in the year of appraisal, achieving the target. However, because the initial projected demand was set high, the actual number of students in 2014 in Jiangxi Province reached only 97% of the target number of the year of project completion.

Table 9: Number of students (Total number of graduate, undergraduate and single department college students)

	Actual	Target	Actual	Actual
	Appraisal year	Project completion year	Original target year	2014
Guangxi	63,000	112,000	91,000	247,000
Jiangxi	117,000	208,000	197,000	202,000
Hubei	162,000	228,000	218,000	284,000
Shanxi	92,000	131,000	117,000	146,000
Total	434,000	679,000	623,000	879,000

Sources: JICA appraisal documents, responses to the questionnaire from the executing agency

Notes

1) The year of appraisal was 2001 for Guangxi Province and 2002 for Jiangxi, Hubei and Shanxi Provinces. The target year for project completion (original target year) was 2006 for Guangxi Province and 2007 for Jiangxi, Hubei and Shanxi Provinces while the year of project completion was 2013 for Guangxi and Shanxi Provinces, 2014 for Jiangxi Province and 2015 for Hubei Province.
2) Single-department college students are equivalent to junior college students in Japan.

There was also a substantial increase in the building area, as in the case of the number of students. The actual figure for the original target year almost reached the target (total building area in the original target year: 10.99 million m^2). The total building area in the four provinces increased by 6.38 million m^2 (138% of the original figure in the year of appraisal) in approximately five years from the year of appraisal to the original target year. The rate of increase was especially high in Guangxi Province and Shanxi Province. The building area showed a noticeable upward trend during the post-project period, reaching a total of 17.06 million m^2 for the four provinces in 2014. This was 3.7 times the initial building area of 4.61 million m^2 in the year of appraisal. The target for the project completion year was achieved by 2014 in all provinces. At some universities, the added building area under the Project was greater than those proposed in the original plan. As a result, the actual increase under the Project exceeded the plan in Guangxi and Jiangxi Provinces.

Table 10: School building area
(Classrooms, laboratories, libraries, gymnasiums and auditoriums)

Unit: m^2

	Actual	Target (Project completion year)		Actual (Original target year)		Actual (2014)	
	Appraisal year	Total	Portion under the Project	Total	Portion under the Project	Total	Portion under the Project
Guangxi	656,325	1,391,143	146,000	1,737,700	28,257	3,474,653	183,335
Jiangxi	1,201,262	2,992,852	152,800	2,881,762	168,208	4,873,971	168,208
Hubei	1,901,304	3,739,502	169,000	4,002,266	113,513	5,376,094	159,313
Shanxi	855,890	1,682,774	130,000	2,372,537	0	3,333,301	97,718
Total	4,614,781	9,806,271	597,800	10,994,265	309,978	17,058,019	608,574

Sources: JICA appraisal documents, responses to the questionnaire from the executing agency.

The total monetary value of the educational and research equipment at each targeted university also increased substantially. Although no target was set at the time of appraisal for the monetary value of the educational and research equipment, the total value in the project completion year was 4.63 billion yuan for the four provinces, indicating that the total value of such equipment owned by the targeted universities more than doubled in approximately five years. In 2014, the total value for the four provinces was 10.92 billion yuan, which is approximately five times the amount in the year of appraisal (2.16 billion yuan). The rate of increase was much higher than that of the number of students and the building area.

The actual monetary value of the added equipment under the Project was slightly below the planned value in all of the provinces except Hubei Province due to the cancellation and adjustment of some of the planned equipment. In Hubei Province, the actual value exceeded the planned value: the ODA loan originally earmarked for subsequently cancelled construction work was diverted to the procurement of additional educational and research equipment.

Table 11: Total monetary values of educational and research equipment

Unit: thousand yuan

	University total			Portion under the Project		
	Actual (Appraisal year)	Actual (Original target year)	Actual (2014)	Target (Project completion year)	Actual (Original target year)	Actual (2014)
Guangxi	266,760	670,930	2,227,610	152,930	0	148,070
Jiangxi	961,570	1,890,160	3,700,500	300,740	100,340	291,680
Hubei	453,330	1,261,560	2,842,850	251,440	0	320,340
Shanxi	477,050	809,170	2,146,830	260,130	208,480	237,550
Total	2,158,710	4,631,820	10,917,790	965,240	308,820	997,640

Sources: JICA appraisal documents, responses to the questionnaire from the executing agency.

The findings of the questionnaire survey and interview survey conducted at each university indicate that the utilization rate is high for both the buildings constructed and equipment procured under the Project. The utilization rate of major equipment appears to be higher than 90% in most universities. There are many advance bookings for transmission microscopes and other equipment of which the utilization rate is particularly high; prospective users often have to wait for one or two weeks. Some of the equipment procured under the Project, such as the gene analysis apparatus, is very valuable, and only one of such apparatus is available at a university or even in a wider area.

(2) Qualitative enhancement of teaching and research

At the time of appraisal, "the school building area per student" and "the monetary value of equipment per student" were set as indicators for the qualitative improvement (enhancement) of teaching and research. The actual performance of these indicators is shown in Table 12. Because the increase in the building area and monetary value of the educational and research equipment was greater than the increase in the number of students in all four provinces, the actual performance of these indicators is very high. The building area per student already exceeded the target in the original target year. In 2014, both the school building area per student and the monetary value of equipment per student were double or treble those in the year of approval in all four provinces. It was found that the average school building area and the monetary value of equipment per student satisfied the national standard at most targeted universities, implying that the quality of teaching/research environment was ensured to a certain degree.

Table 12: School building area (teaching, research and administration) per student and monetary value of educational equipment per student

	School building area per student (m^2)							Value of educational equipment per student (yuan)	
	Actual (Appraisal year)	Target (Project completion year)		Actual (Original target year)		Actual (2014)		Actual (Appraisal year)	Actual (2014)
		Area per student	Increment through this project	Area per student	Increment through this project	Area per student	Increment through this project		
Guangxi	10.1	11.3	1.58	23.5	0.31	32.7	1.01	3,760	10,230
Jiangxi	12.9	14.2	0.76	17.2	0.88	24.2	0.81	3,326	10,975
Hubei	11.1	14.5	0.98	21.4	0.77	20.8	0.73	3,338	9,964
Shanxi	7.4	9.7	1.25	16.4	0.00	16.1	1.13	5,391	13,321

Sources: JICA appraisal documents, responses to the questionnaire from the executing agency.
Notes
1) The value for each province is the simple average of the corresponding values for individual universities.
2) The national standard (for ordinary university departments) varies from one department to

another. For example, the standard school building area per student ranges from 9 m^2 for a medical department to 22 m^2 for a social science department while the standard monetary value of equipment per student ranges from 3,000 yuan for a social science department to 5,000 yuan for such science departments as engineering, agro-science and medicine.

Table 13 outlines the performance (outcome) of indicators for the quantitative and qualitative enhancement of higher education that can be recognized externally when measured against relevant permits or designations by the Ministry of Education (equivalent to Japan's Ministry of Education, Culture, Sports, Science and Technology). While each indicator shows progress, a particularly noticeable improvement is made in the number of key disciplines (provincial/ministerial level[14]), number of key laboratories (state level as well as provincial/ministerial level), number of master's degree and doctorate programs and number of research projects (state level as well as provincial/ministerial level). The actual figures for 2014 more than trebled those for the year of appraisal. Some improvements were made in the number of key disciplines (state level) and number of key laboratories (state level) for which the target figures are strictly set because of the very high criteria to be met. For those indicators for which the target value in the project completion year was set in the year of appraisal, very few reached the target by the original target year. However, three indicators apart from the number of key disciplines (state level) achieved the target by 2014. The interview survey with senior staff members and those in charge of project implementation at the targeted universities found that the Project, especially in the provision of educational and research equipment, had greatly contributed to achieving the set targets. Much of the equipment procured under the Project are currently used for key disciplines, laboratories and research projects while some of the teachers who underwent training in Japan are participating in research projects.

Since the commencement of the Project, 10 colleges have been upgraded to universities, eight universities have commenced master's degree programs and 10 universities have installed doctorate programs. In order for these new programs to be officially approved, it is crucial that the hard components of school infrastructure meet and surpass a certain level. It is evident that the enhanced level of these hard components under the Project at these universities significantly contributed to this educational upgrade.

[14] Those designated by a provincial government or ministry are classified as "provincial/ministerial level" while those designated by the state are classified as "state level".

Table 13: Trend of major teaching/research outcome indicators (total of the targeted universities)

		Actual (Appraisal year)	Target (Project completion year)	Actual (Original target year)	Actual (2014)
Guangxi	Number of key disciplines (state level)	0	0	0	0
	Number of key disciplines (provincial/ministerial)	23	41	34	139
	Number of key laboratories (state level)	0	-	-	2
	Number of key laboratories (provincial/ministerial)	0	-	-	50
	Number of undergraduate faculties/departments	82	-	-	208
	Number of master's degree programs	70	178	203	386
	Number of doctorate degree programs	0	26	4	28
	Number of research projects (state level)	19	-	-	289
	Number of research projects (provincial/ministerial)	77	-	-	424
Jiangxi	Number of key disciplines (state level)	2	23	4	6
	Number of key disciplines (provincial/ministerial)	51	110	85	139
	Number of key laboratories (state level)	2	-	-	7
	Number of key laboratories (provincial/ministerial)	5	-	-	135
	Number of undergraduate faculties/departments	266	-	-	543
	Number of master's degree programs	158	352	443	758
	Number of doctorate degree programs	13	45	33	130
	Number of research projects (state level)	24	-	-	450
	Number of research projects (provincial/ministerial)	225	-	-	1,156
Hubei	Number of key disciplines (state level)	0	26	0	1
	Number of key disciplines (provincial/ministerial)	84	168	102	169
	Number of key laboratories (state level)	0	-	-	6
	Number of key laboratories (provincial/ministerial)	15	-	-	96
	Number of undergraduate faculties/departments	349	-	-	681
	Number of master's degree programs	107	269	308	548
	Number of doctorate degree programs	9	40	29	85
	Number of research projects (state level)	107	-	-	477
	Number of research projects (provincial/ministerial)	384	-	-	2,048
Shanxi	Number of key disciplines (state level)	5	34	11	7
	Number of key disciplines	35	84	89	103

	(provincial/ministerial)				
	Number of key laboratories (state level)	2	-	-	3
	Number of key laboratories (provincial/ministerial)	24	-	-	69
	Number of undergraduate faculties/departments	156	-	-	234
	Number of master's degree programs	195	339	342	414
	Number of doctorate degree programs	30	85	57	136
	Number of research projects (state level)	119	-	-	913
	Number of research projects (provincial/ministerial)	564	-	-	1,136

Sources: JICA appraisal documents, responses to the questionnaire from the executing agency
Note: An indicator for which the target value was not set at the time of appraisal is given a value of 0 (-). As the reference values at the time of appraisal were verified by the reference materials used at the time, they are included in this table.

3.3.2 Qualitative Effects

(1) Effects of the hard components

The principal effect of the hard component is "improvement of teaching and research conditions and the environment". There are many concrete cases where improvements have been achieved: ① new research and experiments have become possible by the latest equipment which were not available prior to the implementation of the Project (for example, cell level bio-chemical analysis), ② opportunities for practical training and research have significantly increased due to an increased number of equipment per student (For example, the Project contributed particularly to faculties/departments prioritized by the Project for the procurement of equipment, and testing and analysis centers with expensive equipment. The monetary value of the equipment procured under the Project exceeds 30-50% of the total monetary value of the equipment), ③ integral research has become possible through the combination of a variety of research equipment and ④ foundations for teaching and research have been consolidated as a result of the increased number of books and advancements in digitalization through the improvement of libraries and related systems.[15]

Next is "the contribution towards better assessments of universities by the Ministry of Education". Universities in China undergo periodic assessments by the Ministry of Education, and higher assessment scores lead to the admission of excellent human

[15] In those universities where libraries have been improved under the Project, the number of books in stock and the number of users both increased after improvement.

		Number of books	Number of users (per day)
Guangxi	Guangxi University of Chinese Medicine	580,000 → 870,000	17,977 → 21,455
	Guangxi Normal University	580,000 → 1,200,000	2,000 → 8,000
	Guilin Medical University	500,000 → 890,000	3,000 → 8,000
	Guangxi University of Science and Technology	1,590,000 → 1,790,000	18,089 → 20,277
Jiangxi	Shangrao Normal University	580,000 → 870,000	8,200 → 9,300

Source: Responses to the questionnaire from the executing agency

resources, an increase in financial support and the accelerated designation of key disciplines and laboratories. Therefore, these assessment results are highly significant for universities. In this university assessment by the Ministry of Education, the level of existing facilities and educational/research equipment serve as an important criterion. There are many cases where improvements in the hard component under the Project have contributed to universities passing or even obtaining high assessment marks from the Ministry of Education. The introduction of new educational and research equipment under the Project was delayed at many universities; yet, despite the lack of actual equipment delivery, the Project contributed to positive assessment scores because the eventual introduction of new equipment was ensured under the Project. However, there were also other cases where the Project did not contribute to high assessments by the Ministry of Education because the planned improvement of university equipment could not be achieved in time for the assessment. Cases of non-contribution are particularly evident in Jiangxi Province, where the construction of facilities with ODA loan was not planned (for example, Shangrao Normal University assessed in 2005, Nanchang University assessed in 2006 and East China Jiaotong University assessed in 2005).

(2) Effects of the soft components

The findings of the interview survey with senior staff members and those in charge of project implementation at the targeted universities and the beneficiaries survey with the training participants indicated that many of the participants, excluding some universities, found the training that was part of the soft component of the Project to be a useful opportunity to learn about the contents of advanced research and education, as it was rare to have the opportunity for long-term overseas training to obtain advanced specialist knowledge.[16] Many participants also mentioned that the training provided an opportunity to obtain proper knowledge of Japanese society.[17] As mentioned earlier, long-term training in specialist fields was not conducted as planned in some provinces, and the expected effects of the training were not likely to have been fully achieved. Nevertheless, there was a general tendency among universities to send trainees in prioritized departments or disciplines that were expected to contribute to their developments. As a result, there have been many cases where the training outcomes have been actively utilized. Concrete

[16] The beneficiaries survey with the training participants found that almost all of the participants positively valued their training (37% said that the training was very useful, 51% said it was useful and no respondents selected the answer of "it was not very useful" or "not useful at all". The remaining 12% did not reply to the question. When the scope of respondents was narrowed to those undergoing long-term training of one year or more in specialist fields, more than half (53%) said that the training was "very useful", indicating the higher level of appreciation of the training in this group.

[17] The same beneficiaries survey found that 44% of the respondents said that their understanding of Japan "had very much deepened" while 53% said that it "had deepened", indicating the contribution of the training to understanding of Japan on the part of the trainees. One noticeable feature is that there was little difference in the selected answers between long-term trainees and short-term trainees, suggesting that even short-term training can contribute to a deeper understanding of Japan among trainees.

examples of such use are listed below.

1) Fostering of key university persons

Many of the training participants are considered to be key persons at their own universities. Many of them were promoted on their return to China and currently hold important positions, such as professors responsible for key laboratories at a university or department. Most training participants have written academic papers since their return to China, utilizing the new knowledge obtained through their training.

2)Boosting of the research level and development of research in advanced or new fields previously unexplored

There are many cases where the research level has been enhanced (increase in the production of high-quality academic papers, among other aspects) and research in new fields, etc. has been initiated due to contact with the most advanced research fields and equipment in Japan. Some of these research initiatives have been authorized as national research projects. At some universities, a number of advanced equipment (such as those that the trainees used in Japan during their training) have been newly installed to boost their research level.

3)Improvements in the teaching method

Many of the training participants gained the impression that the relationship between professors and students is much closer in Japan than in China and that guidance is given by professors who fully understand the needs of individual students through efficient communication. Because of this, many became conscious of providing careful guidance to their students since their return to China. More precisely, there have been many cases where the Japanese teaching method of “regularly holding seminars and allowing students to present papers on set themes for discussion” has been adopted. Another improvement in the teaching method is encouraging undergraduates to participate in advanced research work much sooner than before.

4)Launching new courses and strengthening departments

There have been many cases where the training outcomes were fully utilized from the viewpoint of effectively promoting new initiatives such as the enhancement of many newly established departments and courses (for example, Japanese language course) as well as key disciplines (for example, environmental science). Many universities have combined the improvements in hard and soft components under the Project to ensure effective strengthening of their departments. In several universities, training participants whose English proficiency was significantly improved through the training now play a key role in the newly introduced English course for foreign students.

5)Improvements in university management

The short-term training course on university management was introduced in response to

the changes in the business environment for Chinese universities. These changes include the expansion of the scale and institutional reform. The interview survey with senior staff members and those in charge of project implementation at the targeted universities and with former trainees found that the course is in line with "the actual needs faced by universities for the promotion of modernization and improvement of the management level". While the actual achievements of this course vary greatly from one university to another, there are many cases where the positive outcomes of such course are utilized (see Box 2).

Box 2: Examples of improved university management utilizing the outcomes of university management training

- Promotion of cooperation with companies (Establishment of courses linked to companies: companies not only provide funding but also arrange study visits for students and the dispatch of lecturers to assist students) (Jiangxi Province)
- Improvement of the fund raising method (Establishment of "an education fund" to strengthen fundraising activities that target the alumni. A total of approximately 20 million yuan was collected to commemorate the anniversary of the foundation, contributing to better financial health of the university.) (Jiangxi Province)
- Utilization of IT for management work (Development of a management software to centralize student information, referring to examples of Japanese universities) (Jiangxi, Shanxi and Hubei Provinces)
- Improvement of the teaching method utilizing ICT (Reinforcing lecture contents by "chatting" with students during lectures to understand their questions and opinions to further identify the level of understanding of the lecture) (Jiangxi Province)
- Enhanced support for student life (Establishing a support center for sexual harassment, etc., providing support to find part-time employment, and daily life and mental health guidance) (Jiangxi and Guangxi Provinces)
- Improvement of new facilities (Introducing an exchange space for teachers and students, barrier-free floor plan and guiding signs for directions)
- Establishment of a system that enables teachers to become actively involved in university management (Jiangxi, Hubei and Shanxi Provinces)

3.4 Impact

3.4.1 Intended Impacts

(1) Enhancement of teaching and research results at the targeted universities

Table 14 outlines the performance of indicators that are believed to represent enhancement in teaching and research results (impact indicators) among the teaching and research-related indicators.

While every indicator showed improvements, the number of published research papers, number of awards and number of granted patents in 2014 were three times or more the corresponding numbers in the year of appraisal. In particular, the number of academic papers listed in the SCI (Social Science Citation Index), EI (Engineering Index) and ISTP (Index to Scientific and Technical Proceedings)[18] increased by 31 times, while the number

[18] As SSCI and SCI/EI/ISTP are international databases for the social science field and the science,

of patents granted increased by 30 times during this period. These massive improvements of indicators points to a substantial enhancement of the teaching and research levels and their outcomes at the targeted universities. The graduation rate exceeded 96% in each province in the year of appraisal. Although only Jiangxi Province achieved the target graduation rate in the original target year, all provinces maintained high graduation rates despite massive increases in the number of students. Meanwhile, both the graduate employment rate and the post-graduate enrollment rate increased in every province. The employment prospects for graduates in China are not necessarily favorable (see Table 15) but graduates of the targeted universities enjoy a relatively high employment rate. The increased post-graduate enrollment rate is likely attributable to ① the increasing demand for highly educated personnel in China and ② the expansion of post-graduate education at the targeted universities in addition to improved teaching and research outcomes.

Table 14: Trends in major teaching/research impact indicators (total of the targeted universities)

		Actual (Appraisal year)	Target (Project completion year)	Actual (Original target year)	Actual (2014)
Guangxi	Number of award-winning research (state level)	3	-	-	27
	Number of award-winning research (provincial/ministerial)	20	-	-	127
	Number of patented research outcomes	5	-	-	569
	Number of research papers (SSCI)	2	-	-	5
	Number of research papers (SCI・EI・ISTP)	108	-	-	918
	Graduation rate	96%	97%	95%	95%
	Graduate employment rate	89%	-	-	93%
	Post-graduate enrollment rate	2%	-	-	6%
Jiangxi	Number of award-winning research (state level)	0	-	-	2
	Number of award-winning research (provincial/ministerial)	26	-	-	163
	Number of patented research outcomes	18	-	-	604
	Number of research papers (SSCI)	0	-	-	25
	Number of research papers (SCI・EI・ISTP)	83	-	-	2,593
	Graduation rate	97%	98%	98%	99%
	Graduate employment rate	84%	-	-	87%
	Post-graduate enrollment	6%	-	-	10%

technology and engineering fields, respectively, they are used as indicators for the production of high-level academic papers.

	rate				
Hubei	Number of award-winning research (state level)	8	-	-	21
	Number of award-winning research (provincial/ministerial)	62	-	-	125
	Number of patented research outcomes	10	-	-	853
	Number of research papers (SSCI)	2	-	-	87
	Number of research papers (SCI・EI・ISTP)	162	-	-	3,429
	Graduation rate	97%	99%	98%	98%
	Graduate employment rate	89%	-	-	91%
	Post-graduate enrollment rate	15%	-	-	21%
Shanxi	Number of award-winning research (state level)	5	-	-	2
	Number of award-winning research (provincial/ministerial)	77	-	-	106
	Number of patented research outcomes	43	-	-	371
	Number of research papers (SSCI)	163			1,121
	Number of research papers (SCI・EI・ISTP)	293			13,482
	Graduation rate	99.6%	99.6%	96.8%	98.6%
	Graduate employment rate	83%			85%
	Post-graduate enrollment rate	10%			11%

Sources: JICA appraisal documents, responses to the questionnaire from the executing agency.
Note: An indicator for which the target value was not set at the time of appraisal is given a value of 0 (-). As the reference values at the time of appraisal were verified by the reference materials used at the time, they are included in this table.

(2)Enhancement of teaching and research at the provincial level

The performance of the higher education indicators in each province is shown in Table 15. Some indicators, noticeably the school building area per student, graduate employment rate and number of students per teacher, have failed to achieve the target values of 2014 in some provinces. However, most of the provincial-level quantitative indicators introduced at the time of appraisal have exceeded the target values of 2014. The targeted universities of the Project are highly ranked in terms of scale, etc. among provincial higher education institutions, and their improvement has played an important role in the improvement of the provincial-level higher education indicators.

Table 15: Higher education indicators of targeted provinces

		Actual (Appraisal year)	Target (Project completion year)	Actual (Original target year)	Actual (2014)
Guangxi	Number of regular HEIs	41	41	62	76
	Number of students enrolled in regular HEIs	288,355	555,000	400,738	727,801
	Enrollment rate in HEIs	8%	13%	15%	27%
	School building area per student (average of targeted universities) (m^2/person)	31.8 ㎡	36.0 ㎡	28.8 ㎡	27.1 ㎡
	Monetary value of education and research equipment per student	3,700yuan	5,200 yuan	6,198 yuan	8,902 yuan
	Number of students per teacher	22	18	17	18
	Graduation rate	95%	98%	96%	98%
	Graduate employment rate	86%	93%	87%	90%
	Post-graduate enrollment rate	3%	8%	9%	8%
Jiangxi	Number of regular HEIs	48	70	66	95
	Number of students enrolled in regular HEIs	266,300	600,000	795,374	944,075
	Enrollment rate in HEIs	27%	60%	35%	35%
	School building area per student (average of targeted universities) (m^2/person)	37 ㎡	40 ㎡	28 ㎡	32 ㎡
	Monetary value of education and research equipment per student	-.	-.	5,467 yuan	8,362 yuan
	Number of students per teacher	16	18	12	17
	Graduation rate	96%	98%	79%	79%
	Graduate employment rate	64%	80%	80%	86%
	Post-graduate enrollment rate	7%	7%	7%	9%
Hubei	Number of regular HEIs	75	85	86	123
	Number of students enrolled in regular HEIs	585,000	1,100,000	1,163,686	1,419,699
	Enrollment rate in HEIs	18%	25%	27%	47%
	School building area per student (average of targeted universities) (m^2/person)	11.6 ㎡	16.0 ㎡	11.8 ㎡	12.3 ㎡
	Monetary value of education and research equipment per student	6,226 yuan	-	7,890 yuan	11,734 yuan
	Number of students per teacher	15	14	15	16
	Graduation rate	99%	99%	Not available	Not available
	Graduate employment	80%	90%	Not	Not

	rate			available	available
	Post-graduate enrollment rate	11%	17%	Not available	Not available
Shanxi	Number of regular HEIs	39	41	59	71
	Number of students enrolled in regular HEIs	208,000	400,000	Not available	713,218
	Enrollment rate in HEIs	14%	20%	Not available	Not available
	School building area per student (average of targeted universities) (m^2/person)	7.0 ㎡	10.0 ㎡	30.9 ㎡	27.1 ㎡
	Monetary value of education and research equipment per student	4,498 yuan	-	6,189 yuan	8,558 yuan
	Number of students per teacher	18	22	15	18
	Graduation rate	97%	98%	99%	99%
	Graduate employment rate	80%	88%	83%	70%
	Post-graduate enrollment rate	1%	2%	12%	14%

Sources: JICA appraisal documents, responses to the questionnaire from the executing agency.

(3) Contribution to regional vitalization, strengthening of market economy reform, and environmental conservation

Regarding the three development issues expected to be addressed at appraisal, namely, (i) regional vitalization, (ii) strengthening of market economy reform and (iii) environmental conservation, sufficient quantitative data could not be obtained to show the overall trend for ex-post evaluation. Moreover, as large-scale universities tend to simultaneously implement a number of development projects, it made it difficult to discern the impact of the Project. Nonetheless, several cases of contribution have been identified, as described below.

1)Regional vitalization

In each province, leading universities that specialize in engineering, education, medical and social sciences were included in the targeted universities, and they have constantly produced graduates in these fields, which are essential for regional vitalization. The key industries in these provinces provide the main employment opportunities, and the number of graduates employed in these industries has been increasing, reflecting the increase in the number of graduates. The promotion of key industries and the vitalization of poor areas are leading policy issues of every provincial government. Each university is engaged in many projects commissioned by government organizations, notably provincial governments, contributing to regional vitalization. There are many cases where universities become involved in local development by cooperating with local companies and organizations. The equipment procured under the Project is actively used in many of these projects. The

expensive equipment procured under the Project is now registered under the public platform run by China's Ministry of Science and Technology and is often used by other universities, organizations and private companies.

Examples of projects for regional development commissioned to the targeted universities
- Training on farming techniques for farmers (project organized by a local government)
- "Development and practical use of teaching materials for English teachers in rural primary schools" and "training of young migrant workers from rural areas in cooperation with companies" using Internet education facilities
- Training of hospital personnel in rural areas
- Research on the treatment of local diseases
- General support for the promotion of local agriculture to become a sixth sector[19]
- Establishment of special classes for minority groups

Examples of cooperation between targeted universities and external organizations/companies
- Joint research or projects with external organizations and/or companies using research equipment owned by the university
- Technical support and technological development/research for agricultural/stock raising companies

2)Strengthening of market economy reform

In China, universities are moving to become comprehensive universities. As a result, the number of graduates from the targeted universities in fields relevant to the Project has shown an increasing trend. Specific examples of projects concerning the strengthening of market rules include (a) the training of managers of coal-producing companies (including financial training using equipment available at universities) and (b) promotion of the modernization of universities using the contents of the short-term manager training in Japan.

3)Environmental conservation

The environmental field has become a key discipline at many universities due to the increasing need in China, and conscious efforts have been made to bolster environment-related disciplines. There have been cases where new environmental courses and departments have been established, and environmental studies have been designated as a key discipline after the commencement of the Project. The number of graduates in the environmental field has also seen a rise. The environment has been one of the key fields for improvement of the educational and research equipment as well as training in Japan under the Project. There have been many cases of universities receiving grants for research projects or being commissioned to conduct studies (projects). In many cases, the equipment procured under the Project was actively utilized and/or former trainees were involved. Some specific examples include (a) research on environmental monitoring, analysis and

[19] The sixth sector points to the business expansion from agriculture (primary industry) to secondary (food processing) and tertiary (distribution and sales) industries.

treatment methods, (b) implementation of a JICA grassroots technical cooperation project in collaboration with the Saitama Prefectural Government (see Box 3) and (c) research on air pollutants (such as PM2.5).

Box 3: Development of international environmental research using exchange between local public bodies and JICA scheme (Shanxi Province)

Professor Xie Yinhe of the College of Resources and Environment, Shanxi Agricultural University had no personal experience of studying abroad prior to the Project. Yet, he underwent his first overseas training for six months at the Center for Environmental Science in Saitama (CESS) in Saitama Prefecture, which has a friendship exchange relationship with Shanxi Province, with the assistance of relevant organizations such as the Shanxi Provincial Foreign Affairs Section and his own university. This Center had previously accepted officials of the Shanxi Provincial Government, and the presence of a Chinese researcher at the time of the Project facilitated the acceptance of his training there. The Center has much experience accepting foreign trainees and offers accommodation for these trainees. As the proposed research theme (impact of heavy metals in the soil on the environment) suited the Center, Professor Xie was able to conduct productive research, which involved the daily checking of more than 100 samples.

Given the short training period, Professor Xie explored the possibility of research cooperation after his training with staff members of the Center during his stay. His enthusiasm and research ability were highly evaluated by the Japanese side, and a research cooperation agreement was signed in 2009 between the College of Resources and Environment, Shanxi Agricultural University and the CESS. Based on this agreement, a soil remediation project using plants, environmental studies, research exchanges and the dispatch of post-graduate students have been conducted, using the international exchange budget of the Saitama Prefectural Government. From 2011 to 2014, the Environmental Technology Support for Shanxi Province in China was implemented as a JICA grassroots technical cooperation project with the cooperation of these two organizations. For the implementation of these research cooperation projects, a number of equipment procured under the Project was actively used.

Professor Xie highly values the Project, saying that “my own experience of participating in an international research project under the Project has had positive impacts on both the university and myself in a number of aspects, including enhancement of the research level, widening of my own horizons as a researcher, development of new research and realization of domestic research projects”.

(4) Realization of a Virtuous Cycle, Including Recruitment of Excellent Human Resources through Improvement of the Environment and Conditions for Education and Research (Contribution of the Project)

The upgrading of facilities and equipment under the Project was conducted separately from the financial assistance of the government, and it was possible for the targeted universities to enjoy improvement (especially of the educational and research equipment) at a higher level than non-targeted universities. As a result, the environment and conditions for education and research improved to enable qualitative improvements in education and research and advanced research, which was not feasible in the past. What has been especially important from the viewpoint of improving education and research at the targeted universities is the accelerated recruitment of excellent human resources. The

targeted universities are now capable of providing favorable conditions such as “the installation of equipment for advanced research”, “designation of key disciplines and key laboratories”, “availability of doctorate courses” and “availability of research exchange facilities with leading universities overseas”. At one university, “the increase of the number of published academic papers is mainly attributed to newly recruited teachers”. As a result, the implementation of the Project has led to an efficient recruitment of enhanced human resources. In one university, it was found that the majority of the increase in published papers was attributable to the newly recruited professors. Through the implementation of the Project, the strengthening of human resources essential to conduct advanced education and research has been realized.

The quantitative and qualitative improvements in education at the targeted universities of the Project have resulted in concrete enhancements, such as increased number of research awards. Moreover, the actual performance in terms of human resources development for “regional vitalization”, “strengthening of market economy reform” and “environmental conservation” has improved, along with an increase in the number of contracted research and cooperative projects (income from contracted research). Consequently, university finance has been bolstered, resulting in further strengthening of the foundations for education and research, recruitment of excellent human resources and obtaining of commissioned work. It is, therefore, fair to say that the Project has enabled the smooth realization of a virtuous cycle through integrated assistance for both the hard and soft aspects, successfully fostering key universities in line with the policy objective of provincial education bureaus.

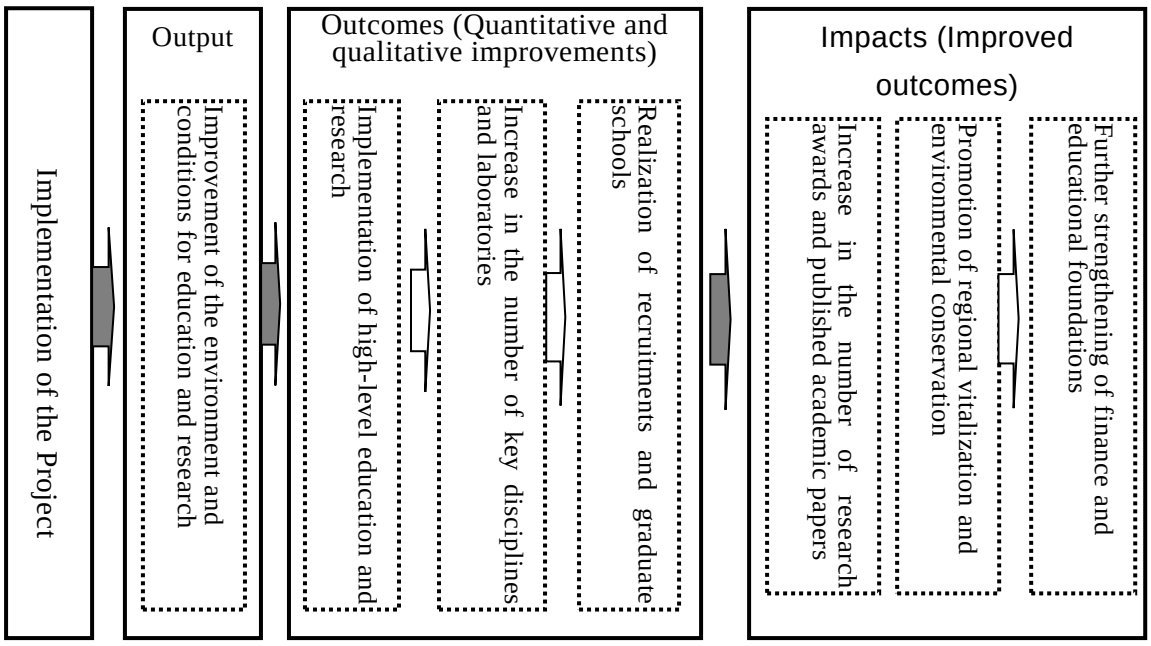


Figure 1: Contributions of the Project

Box 4: Impacts of the Project delay on the quantitative and qualitative improvement of education at the targeted universities

For the procurement of facilities and equipment under the Project, JICA provided constant assistance through collaboration with provincial education bureaus and the targeted universities. A series of procurement seminars were organized in collaboration with provincial education bureaus, based on the preconditions that ① procurement would be international procurement in line with the rules for procurement with Japan's ODA loan and ② domestic procurement would be encouraged in line with China's own procurement rules. Despite such assistance, delays occurred at the implementation stage. Initially, early realization at a higher level of the virtuous cycle shown in Fig. 1 was expected to take place at the targeted universities, where improvement of the facilities and equipment would be conducted prior to other universities. As a result of the delayed procurement, however, it cannot be denied that some of the expected positive results of the Project were curtailed.[20] For the introduction of educational and research equipment, more than 10 procurement packages were arranged for each province. When the length of time required for the signing of the contract and completion of delivery in each province is examined in terms of "the average length of time required to complete each package", the length of time required for the signing of the contract ranged from 45 months to 108 months and the length of time required for completion ranged from 68 months to 115 months (see Table 16). The length of time required to complete the delayed packages was much longer. Because of this, the actual performance in the original target year for completion was rather insufficient, as shown in Table 17. In particular, the shortage of the procured educational and research equipment was acute. As procurement or replacement by local funding would mean wasteful duplication, the scope of using local funds was limited. The impact of the delayed implementation of the Project was, therefore, very severe in terms of procurement. The Project was characterized by ① its implementation during the development stage of economy and universities, ② assistance for both the hard and soft aspects, especially assistance for the procurement of a large number of educational and research equipment, including advanced equipment, and ③ 10 or more independent universities as targets in each province. effective implementation of the Project was particularly important to ensure excellent and enhanced outcomes. Because of the delay, however, the achievement of improved environment and conditions for education and research was delayed, somewhat hampering the virtuous cycle to achieve quantitative and qualitative improvement of education and research and to produce better outcomes of education and research.

Table 16: Average length of time to complete the Project after signing of the contract

(approximate number of months)

		Guangxi	Jiangxi	Hubei	Shanxi
Construction of buildings	Until the completion of construction work	70	10	35	70
Educational and research equipment	Until the signing of the contract	108	56	59 (Phase 1)	45
	Until the completion of delivery	115	68	96 (Phase 1)	95

Sources: JICA internal documents; responses to the questionnaire from the executing agency

Notes

1) The length of time for the construction work is the average of all universities. The length of time for the procurement of equipment is the average of individual packages.

2) In Hubei Province, procurement was conducted in two phases, as part of the ODA loan for the construction work was diverted to the procurement of equipment at the project implementation stage.

Table 17: Actual state of completion in the original target year for completion

[20] The fact that the actual performance of the long-term training in specialist disciplines was below the planned level suggests that the effect of the Project through the enhanced expertise of the teachers was adversely affected to some extent.

	Guangxi	Jiangxi	Hubei	Shanxi
Construction of buildings (based on building area)	15%	100%	71%	0%
Procurement of equipment (based on monetary value)	0%	34%	0%	88%

Sources: JICA internal documents; responses to the questionnaire from the executing agency

Some examples of the impact of the delayed implementation of the Project are listed below. Without the delay, the intended development of the targeted universities would certainly have been achieved more effectively.

- The Project was not completed in time for assessment by the Ministry of Education.
- Some adverse impacts were observed in the approval of key disciplines, key laboratories and research projects, expansion of the master's degree and doctorate courses, and establishment of graduate schools.
- The continued shortage of educational and research equipment until their delivery made it unavoidable for many students to share limited equipment.
- The planned teaching and research sessions could not be conducted (some universities procured the minimum amount of the necessary equipment for their teaching using their own funds, while others endured prolonged lack of equipment due to their avoidance of duplicated procurement of the same equipment).
- Some universities procured the minimum amount of the necessary equipment with their own funds so that their newly constructed campuses will not remain idle because of the absence of equipment.
- Some universities introduced new disciplines and recruited new teachers based on the expectation that the equipment will be delivered. Yet, they could not provide sufficient education because of the delayed equipment delivery (some of them dealt with the situation by procuring equipment with their own funds or conducting experiments, etc. at other universities).
- The strengthening of the practical capability for students to pass the enrollment examinations for graduate schools was not conducted as planned.

3.4.2 Other Impacts

(1)Impacts on the natural environment

No negative impacts were observed. The environmental impact assessment (EIA) for the Project was completed by the time of the appraisal and was approved by the Environmental Protection Bureau, and relevant procedures in China were all completed. Some noises, vibrations and dust from construction and sewage due to the use of the constructed facilities had been expected, but only on a small scale. Each university has been conducting necessary environmental monitoring during and after the Project, and no issues have been identified.

(2) Land acquisition and resettlement

Although issues such as land acquisition and resettlement of residents had arisen in universities where new campuses were constructed, compensation for resettled citizens was properly paid in accordance with relevant Chinese laws. According to the findings of the

interview survey with senior staff members and those in charge of project implementation at the targeted universities, no problems in particular, including complaints by residents, have been reported.

(3)Strengthening of exchanges with universities in Japan

Many of the training participants have maintained contact with their Japanese tutors at a personal level. Although there were many cases where the participants visited their host universities for exchange purposes during subsequent visits to Japan or where the participants exchanged opinions and information on how to proceed with particular research and/or teaching via emails, there were also some cases where contact was lost due to the retirement of tutors. The ongoing exchanges have also not been restricted to the personal level but have also taken place at the university or department level. Table 18 summarizes the actual exchanges between the targeted universities and host universities in Japan (average number of exchanges per university). The types of exchange include short visits by teachers, dispatch of students, joint research and joint events.

Table 18: Exchanges with host universities in the post-training period
(Aggregate from the end of training to the present: average per university)

	Short visit to Japan (times)	Short visit to China (times)	Acceptance of foreign students (persons)	Dispatch of students to China (persons)	Joint research (projects)	Joint event (times)
Guangxi	6.5	14.9	5.7	7.5	3.7	1.0
Jiangxi	4.8	0.8	2.9	3.3	0.9	1.1
Hubei	6.5	2.8	3.3	3.8	0.6	1.5
Shanxi	10.0	1.4	6.9	7.1	3.7	9.1

Sources: Responses to the questionnaire from the executing agency.

By province, the number of exchange is high in Guangxi and Shanxi Provinces, where long-term training in specialist disciplines was more frequently conducted than in other provinces. In Shanxi Province, a project “to invite 100 people” was initiated in 2010 to encourage the recruitment of foreign personnel after the Lehman shock. Using this project and other schemes, Japanese professors from the host universities have been invited for short visits. This project and other schemes must have contributed to the high level of achievement of exchange.

One notable feature of the impact of exchanges with Japanese universities is that the level of impact greatly varies from one targeted university to another. Great outcomes have been achieved in universities that placed strategic importance on the Project as a means of internationalizing their universities and/or departments and strengthening exchanges with foreign universities (and strengthening the university as a result). Among these universities, there has been a successful case of a Chinese student studying in a doctorate course of a

host university that was recruited to consolidate the staff strength and to enhance the foundations for exchange programs with Japanese universities. In contrast, the exchange level was often low at targeted universities that failed to implement systematic efforts during the post-project period.

Because the Project offered the first opportunity for overseas training and exchanges for many of the targeted universities and training participants, many senior staff members and those in charge of project implementation at the targeted universities pointed out in the interview that the Project provided an important opportunity for both universities and individual teachers to direct their attention overseas. There have been cases of the trainees interacting with students from other countries and even studying in other universities in Japan and abroad, using their own or university funds. In other cases, targeted universities have started overseas training of their teachers and other staff members.

The Project has largely achieved its objectives. Therefore, the effectiveness and impact of the Project are high.

Box 5: Improved research level and recruitment of excellent personnel through the expansion of international exchanges (Shanxi Province)

Taiyuan University of Engineering (TUE) is one of the leading engineering universities in China and has been designated as a key university under Project 211[21]. The TEU considered the training under the Project to be an important opportunity to expand its research exchanges with Japanese universities of high research levels and to develop capable human resources in a systematic manner and was actively involved in the Project. For example, its New Materials Research Center contacted the Institute for Material Research, Tohoku University regarding possible training based on past exchanges. It was agreed that the TUE would continually dispatch several young teachers for a period of one year each, developing a strong relationship at the organizational level instead of the personal level. The research exchanges between the two universities were continued in the post-project period. The fact that the TUE is a key university under Project 211 was a contributory factor to realize such exchanges. The use of advanced equipment not yet available in China has made it possible for TUE personnel to pursue high-level research, and the number of approved state level projects at the TUE has been increasing. One notable impact of the training at Japanese universities is "the strengthening of the teaching staff through the recruitment of Chinese doctorate students at host universities in Japan". While dispatching trainees to the Faculty of Engineering, Kyushu University, the TUE successfully recruited three Chinese doctorate students as professors, greatly contributing to the enhancement of the TUE's own staff level and the continuation and expansion of exchanges with Kyushu University. Recruitment following the training under the Project of Chinese post-graduate students studying at Japanese universities has not been limited to the TUE: similar situations have been confirmed for Guangxi Normal University and Hubei University of Technology. Those recruited as professors have been active as core teaching staff members at their universities. This is a positive impact that was not originally assumed for the Project.

[21] Project 211 is a state project in China aimed at creating some 100 key universities in the 21st century (its implementation was decided in 1993 with the Ministry of Education acting as the responsible ministry).

3.5 Sustainability (Rating: ③)

3.5.1Institutional Aspects of Operation and Maintenance

As planned during the appraisal, the facilities and equipment prepared under the Project are operated and maintained by each targeted university, and the Education Bureau of the subject provinces—the executing agency—oversee them. All targeted universities added the developed facilities and equipment to the universities' fixed assets and established the operation and maintenance system with clearly defined responsibilities and procedures by creating regulations such as the procedures for maintenance of large equipment and fund management, work regulations on experiment teaching, the procedures for fixed asset management, etc. In universities with a large number of important equipment, including those procured under the Project, are centrally managed by their own testing and analysis centers or similar facilities. The division of responsibilities among related organizations is clear, and no issues have been identified with respect to the number of staff in charge of operation and maintenance.

3.5.2 Technical Aspects of Operation and Maintenance

No issues were observed in the technical aspects, since all targeted universities regularly carried out maintenance and inspection of the facilities and equipment and outsourced repair works to contractors, such as suppliers, when necessary. To secure the skills necessary to operate and maintain large or sensitive laboratory equipment, the universities appoint full-time technical staff for each instrument or laboratory to manage the equipment in an integrated manner. At all targeted universities, the manuals and precautions are posted near individual instruments for easy reference. Moreover, professors in charge of sensitive equipment receive regular technical training from the manufacturers.

The utilization rate of the newly procured equipment has been high, and active research and educational activities using these equipment suggest that there are no issues regarding the technical capability of using the equipment.

3.5.3 Financial Aspects of Operation and Maintenance

The targeted universities are all affiliated with the provincial government. Their budgets consist of subsidies from the state or province and own income such as tuitions and fees. The interview survey with universities found that the financial support for universities by the government gradually increased under the 11th Five Year Plan (2006 – 2010), and this support was further consolidated under the 12th Five Year Plan (2011 – 2015). Although the actual figure varies from one university to another, each university receives a minimum of several million yuan a year. In the case of large universities, the financial support amounts to 20 – 30 million yuan, including those by the provincial government, to

maintain and improve the facilities. According to available financial data, it can be said that the necessary budget for operation and maintenance is ensured in the university budget. None of the main facilities and equipment installed under the Project were found to be unused due to the lack of budget for operations and repairs.

Table 19: Financial expenditure of the subject provinces (2014)

	Guangxi	Jiangxi	Hubei	Shanxi
Total expenditure (million yuan)	347,979	388,270	493,415	308,528
Expenditure for education (million yuan)	66,053	71,172	98,745	50,728
Higher education budget (million yuan)	8,330	10,440	23,157	6,450
Education expenditure index (2006=100)	412	628	679	420

Sources: Each province statistics book and responses to the questionnaire from the executing agency.

3.5.4 Current Status of Operation and Maintenance

In all targeted universities, the equipment developed by this project are registered in the maintenance and management database. All expensive equipment are also registered and controlled by the public platform run by the provincial science and technology agency. Based on the observation and review of usage or inspection records, it was confirmed that the equipment were mostly in good condition. Some equipment, such as PCs, have short service lifespans. While the deterioration of such equipment is now causing some problems, it is still continuously used. In the case of important equipment, there is a system for users to record the equipment conditions and to note every time the equipment is used. All universities maintained that there is no problem in the purchase and stock of spare parts that are produced.

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

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The Project was implemented for the purpose of improving education and research at a total of 38 universities in Guangxi, Jiangxi, Hubei and Shanxi Provinces in China through the improvement of relevant facilities and equipment and the training of teachers. Relevance of the Project was evaluated to be high, as it was consistent with (i) the higher education policies of China and the subject provinces, (ii) the development needs for quantitative and qualitative enhancement of the universities, and (iii) Japan’s assistance

policies. While the actual effects of the Project were somewhat hampered by the delayed installment of some educational and research equipment, the tangible (hard component) and intangible (soft component) needs were met. Quantitative and qualitative improvements of the higher education at the targeted universities were achieved, as evidenced by the significant increases in the various indicators for education. The high level of effectiveness and the impacts of the Project were also substantiated by the improved outcomes of educational and research activities, making the best use of the advanced equipment and training; and the advancements in the various initiatives designed to achieve regional vitalization, environmental conservation, etc. Efficiency of the Project was evaluated to be fair on the whole: although the Project cost was within the plan, the Project period exceeded the planned period due to delays in procurement. Sustainability was evaluated to be high, with no issues observed in institutional, technical and financial aspects, and the operation and maintenance of the facilities and equipment developed by the Project were in good status.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

None

4.2.2 Recommendations to JICA

As a result of the implementation of the Project, a good relationship has been established between JICA/Japanese universities and leading universities in various parts of China. Academics with long-term or medium-term training experience in Japan are now teaching at these universities. The universities targeted by the Project are leading universities in the subject provinces/areas of the Project, and the former trainees demonstrate a high level of capability in their respective disciplines. Many of them show positive attitudes towards Japan because of their experience of living in Japan for some time. The number of former trainees is believed to exceed 4,000 for the Inland Higher Education Project as a whole. Although the effective utilization of these human resources is highly anticipated, the extent of their utilization has so far been insufficient.

It is imperative, not only for Japan's ODA, but for broader cooperation with China in the future to be implemented in a much more strategic and efficient manner, and this cooperation has reached a stage where new approaches are being sought, including a shift away from the public sector to the private sector. In the efforts to develop a new relationship of cooperation with China, the utilization of the "stock" nurtured by the Project—namely, the targeted universities and former trainee teachers—could prove to be

an effective approach. For example, it would be highly significant to discuss and promote the inheritance of the Project run by other organizations such as the Japanese embassy in China, Ministry of Education, Culture, Sports, Science and Technology of Japan, Japan Foundation to maintain and further develop the relationship between Japanese and Chinese universities that was established under the Project. Needless to say, more detailed examination and analysis are essential for the full utilization of the "stock" developed by the Project. As the Inland Higher Education Project—the umbrella project for the project evaluated here—comes to an end, reassessment of the "stock" (human resources, good relationship between Japan and China, etc.) fostered by the Project[22] becomes essential, in addition to the planning and formulation of a viable strategy to effectively utilize this "stock" to advance Japan's cooperation for China.

4.3 Lessons Learned

(1) Appropriate selection of targets and methods to assist with the matching of universities, etc. in Japan as hosts for long-term training

There were cases in the Project of incomplete matching where some teachers could not receive any training because of their failure to find suitable hosts. In many targeted universities, the search for a host was left to individual applicants, and it was not easy for them to find hosts that met their training expectations. While the information provided by JICA was certainly useful, there was no official support at the individual level.

Considering the large number of trainees involved in the Project and the environment surrounding the Project at the time of project implementation, providing support at the individual level was not a realistic option. However, it is essential to recognize "the importance of support for individual hopefuls for training to ensure smooth and proper matching" in similar projects where training in Japan is provided on a smaller scale or where target universities have little experience with exchange with foreign universities. For these projects, it is essential to fully examine "whether the scope of assistance should remain at the university level or should extend to the individual level" while carefully considering the necessary costs of such extension. In recent years, it has become the standard practice in developing countries for former trainees and prospective trainees to form groups through SNS, etc. to exchange information and experiences, etc. Information and the experiences of former trainees and other training hopefuls are useful in the search for suitable hosts. The effective use of these tools should realize both efficient support for individuals and cost reduction.

[22] Reassessment of the "stock" is also believed to be essential from the viewpoint of disseminating the important outcomes of the Project.

(2) Implementation of appropriate procurement with full consideration of the balance between the actual procurement cost and work load required for adjustment, procurement contents and capacity of the executing agency

Much of the educational and research equipment procured under the Project was under a type of contract where each type of equipment was procured in bulk for distribution to multiple universities, and any change in the quantity or specifications affected the entire procurement schedule for the equipment in question. Because of this and other factors, the overall delivery of the equipment was considerably delayed from the planned delivery time. Under these circumstances, some provinces adopted flexible responses, including university-specific package instead of equipment-specific package. However, it took more than seven years from the commencement of the Project to fully change the original packages. In the end, the volume of work that was necessary to adjust the procurement of equipment to match the reality was much more than originally assumed: there were a large number of targeted universities, and each university faced different circumstances. When an ODA loan project involving various bodies and equipment, especially precision equipment of which the specifications are frequently upgraded, is implemented, the procurement cost, including time and efforts, for smoothly procuring equipment without delay is likely to be extremely high. Necessary measures should be taken based on the recognition of this high cost. At the time of appraisal, it is essential to select an appropriate procurement method while considering the balance between the actual procurement cost and work load required for adjustment, and the procurement contents and capacity of the executing agency, in line with the basic principles put forth by the procurement guidelines. Examples of the necessary measures are listed below.

- For projects where adjustments between diverse bodies are necessary, the possibilities of product-based packages should be considered and fully analyzed. The relative advantages and disadvantages of product-based packages and individual entity-based packages must be analyzed at the implementation stage.
- It is expected that cases requiring major changes of the planned procurement contents and method may emerge at the implementation stage. Apart from a flexible response to such changes from the viewpoint of ensuring the realization of planned project effects, a proper understanding and consent to actively implement the necessary changes should be obtained in advance from the project executing agency and other stakeholder organizations in the recipient country through proper communication.

JICA's active engagement in gathering detailed information on the progress of procurement and strengthening of the monitoring between stakeholders, are especially necessary when (i) the executing agency is unfamiliar with international procurement, (ii) the executing authority has limited authority and insufficient capacity to make necessary adjustments with stakeholders, and/or (iii) the procurement procedure is likely to take a

long time because of the relevant system, etc. of the recipient country.

(3) Sufficient preparation and arrangement to expand exchanges between host universities in Japan and the targeted universities (organizations)

The level of exchange with Japanese universities in the post-training period varies greatly from one targeted university to another, as well as from one former trainee to another. All cases of vigorous international exchanges can be attributed to the proactivity of a Chinese university or person, indicating a strong tendency of such exchanges to rely on the actions of individual universities or persons. The interview survey with the training participants found a strong desire for the expansion of exchange programs with Japanese universities and researchers at the time of this ex-post evaluation. There were cases where no preparations or arrangements to expand these exchange programs in the post-training period were made during the project implementation period. There have also been many cases of individual persons experiencing the limits of expansion because of the lack of support by their own universities and other organizations.

From the viewpoint of facilitating the expansion of exchanges at many universities in the post-training period, it is important for JICA to raise awareness among the senior staff members and those in charge of project implementation at the targeted universities. To raise awareness, it is also essential for JICA to encourage universities at the project planning and implementation stages to systematically expand the scope of exchanges. Careful handling of the issue is required, especially in the case of universities and organizations with little experience of international exchange. Some examples of the careful handling required by JICA are outlined below.

- "① Capacity development" and "② expansion of inter-university exchanges" should be clearly set as the objectives of training at Japanese universities. A proper understanding of these two objectives on the part of the targeted universities is essential.
- The advantages of the expansion of inter-university exchanges should be actively publicized to the personnel of participating universities by introducing the outcomes of the Project and other similar cases.
- It is highly desirable to encourage the targeted universities (at the university level) to properly examine in advance the needs for the expansion of inter-university exchanges, as well as structuring the implementation system and securing budget. This should be followed by the formulation of an action plan (featuring the examination of reports submitted by former trainees on the exchange potential for the university, visits by senior staff members of the targeted universities to host universities with high exchange value at the training implementation stage and with a view to arranging post-training exchanges and other measures).
- It is essential to fully gather information from the project implementation stage on the state of implementation of exchanges and to implement coordination work so that JICA can conduct follow-up activities at an early stage of implementation and so that the cooperation of appropriate organizations other than JICA after the completion of the Project can be secured (consultations with the targeted universities (and host universities) on the implementation of concrete activities in cases where the targeted universities have not initiated any moves to expand their foreign exchanges).

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
① Project Outputs	Target： (Guangxi) 10universities (Jiangxi) 9 universities (Hubei)12 universities (Shanxi)7 universities	Target：same as planned
(a)Hard i) Building construction	(Guangxi) buildings such as libraries for 10 universities; total floor area of 146,0005㎡ (Jiangxi) buildings such as teaching buildings for 9 universities; total floor area of 152,800 ㎡ (Hubei) buildings such as experiment buildings for 10 universities; total floor area of 169,000 ㎡ (Shanxi) buildings such as experiment buildings for 5 universities; total floor area of 130,000 ㎡	(Guangxi) buildings such as libraries for 10 universities; total floor area of 183,335㎡ (Jiangxi) buildings such as teaching buildings for 9 universities; total floor area of 168,208 ㎡ (Hubei) buildings such as experiment buildings for 7 universities; total floor area of 129,313 ㎡ (Shanxi)buildings such as experiment buildings for 5 universities; total floor area of 97,718 ㎡
ii) Procurement of educational equipment	(Guangxi) 7,642 pieces, (Jiangxi) 14,223pieces, (Hubei) 5,843pieces, (Shanxi) 8,345pieces	(Guangxi) 7,160 pieces, (Jiangxi) 11,514pieces, (Hubei) 8,328pieces, (Shanxi) 7,882pieces
(b)Soft Teachers' training in Japan or acceptance of experts from Japan	(Guangxi) 149persons, (Jiangxi) 150persons, (Hubei) 158persons, (Shanxi) 216persons	(Guangxi) 195persons, (Jiangxi) 349persons, (Hubei) 162persons, (Shanxi) 345persons
② Project Period	(Guangxi) January 2003 - March 2006 (39months) (Jiangxi) May 2002 - March 2009 (83months) (Hubei) April 2004 - March 2009 (61months) (Shanxi) April 2004 - March 2009 (61months)	(Guangxi) April 2003 - June 2013 (123months) (Jiangxi) May 2002 - November 2014 (151months) (Hubei) April 2004 - December 2015 (141months) (Shanxi) April 2004 - August 2013 (113months)
③ Project Cost Amount Paid in Foreign Currency	(Guangxi) 4,606million yen (Jiangxi) 4,872 million yen (Hubei) 5,097 million yen (Shanxi) 5,093 million yen	(Guangxi) 4,093 million yen (Jiangxi) 4,517 million yen (Hubei) 4,017 million yen (Shanxi) 5,000 million yen
Amount Paid in Local Currency	(Guangxi)1,419 million yen（95 million yuan） (Jiangxi)3,604 million yen（252 million yuan） (Hubei)3,566 million yen（249million yuan） (Shanxi)3,057 million yen（214	(Guangxi)1,314 million yen（95 million yuan） (Jiangxi)3,290 million yen（230 million yuan） (Hubei) 4,826 million yen（324 million yuan） (Shanxi)2,617 million yen（186

Item	Original	Actual
Total	million yuan）	million yuan）
	(Guangxi) 6,025 millon yen (Jiangxi) 8,476 millon yen (Hubei) 8,663 millon yen (Shanxi) 8,151 millon yen	(Guangxi) 5,407 millon yen (Jiangxi) 7,807 millon yen (Hubei)8,843 millon yen (Shanxi) 7,617 millon yen
Japanese ODA Loan Portion	Same as foreign currency	Same as foreign currency
Exchange Rate	(Guangxi)1yuan =15 yen (As of September 2002) (Jiangxi)1 yuan =14.3 yen (As of August 2003) (Hubei)(Shanxi)1 yuan =14.3 yen (As of July 2003)	（Guangxi） 1 yuan =13.9yen （Jiangxi） 1 yuan =14.3 yen （Hubei） 1 yuan =14.9 yen （Shanxi） 1 yuan =14.1 yen (Average of Project period)