People's Republic of China

Ex-Post Evaluation of Japanese ODA Loan

"Inland Higher Education Project (Regional Vitalization, Market Economy Reform Support, and Environmental Conservation (Jilin Province))"

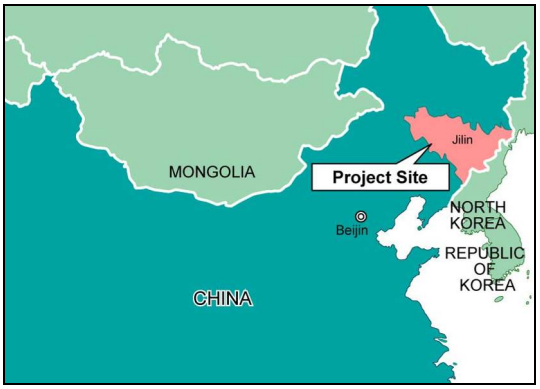
External Evaluator: Hiroshi Oita, OPMAC Corporation

0. Summary

The objective of this project (hereinafter referred to as "the Project") was to improve the quality and quantity of higher education in the designated 8 universities (hereinafter referred to as "the University(ies)") under the Education Department of Jilin Province, by providing equipment and training for teachers and administration staff through the Japanese ODA loan and by expanding the facilities of the Universities through the provincial budget and the internal funds of the Universities. The Project was implemented based on the development policy for higher education in China and met the high needs of higher education. The Project was also consistent with Japanese ODA policy to China, and therefore the relevance of the Project is high. It was also noted that the timely arrangement of the procurement of equipment and training in Japan under the Project increased the opportunities for experiments and research which led to an increase in the number of academic papers. Thus, effectiveness and impact of the Project are high. With regard to project cost, the procurement of equipment and training were implemented almost as planned within the original budget. However, the implementation period was far beyond the planned period because of delays in both training and procurement. Because of this, the efficiency of the Project is fair. The equipment procured has been well maintained from the point of view of the institutional, technical and financial aspects of each University. Even at the time of ex-post evaluation, the equipment is well operated and maintained and kept in a very good condition. The sustainability of the Project is therefore regarded as high.

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

1. Project Description



Project Location
(Jilin Province)

Library
Changchun University of Chinese Medicine

1.1 Background

In the early 2000s, China drifted into a globalization of its economy. The country had been attempting to catch up with international standards and was able to join the World Trade Organization in December 2001, having applied in 1995. It was also an urgent issue for China that it met the needs for human development at an international level. With regard to higher education under "the 9th 5 year plan (1996 – 2000)" China had initiated the "211 Project[1]" which planned to create more than 100 prioritized universities as it moved into the 21st century. In Jilin province, Jilin University, Northeast Normal University and Yanbian University, which are under the control of the Ministry of Education, were included in this project. In May 1998 the "985 Project[2]" was started to establish world-class research type universities. Under this project, selective support was centered on well-known universities in order to create research centers of excellence that could be ranked with the predominant universities of the world. In addition, in December 1998, the Ministry of Education produced the "Action Plan for the Promotion of Education toward the 21st century" which was approved by National Cabinet in January 1999. This set the target of raising the percentage of students proceeding to higher education from 9.8% in 1998 to 15% in 2010. The rapid development of information and communication technology worldwide since the mid-1990s has required human resource development in technology in China and China has recognized the necessity of higher education. Furthermore, the July 2001 decision to hold the Beijing Olympics in 2008 and the December 2002 decision to hold the Shanghai World Exposition in 2010 were cause that triggered the acceleration of internationalization in China.

On the one hand, the internationalization of China was in line with its reforms and market-opening policy but on the other hand, at this time there were emerging internal issues such as the improvement of disparities and the environment. The Project was implemented to tackle the problems of internationalization, disparities and the environment from the point of view of human resource development through strengthening and expanding higher education.

1.2 Project Outline

The objective of the Project was to upgrade higher education in both quality and quantity for the important 8 Universities in Jilin Province by supporting the construction of school

[1] "211 Project" was named according to the government target of establishing more than 100 universities with high priority into the 21st century. The decision for this project was made by the Ministry of Education in 1993. The target of the project was to develop excellent human resources with a high level of knowledge through continuous investment in the selected universities and faculties over more than 10 years, as well as to establish a scientific technology basis for experts who can solve the various problems arising in the course of nation building and social development. (refer to "Present state and tendency of higher education in China" 2010 edition, by the China Research and Communication Center of the Japan Science and Technology Agency)

[2] "985 Project" was a national project which aimed at establishing a set of world first-class and internationally well-known research type universities. On May 4, 1998, at a ceremony commemorating the 100 year anniversary of Beijin University, the then President Jiang Zemin proposed that China should have first-class universities of a world advanced level in order to achieve modernization. Based on this message, the project was started as "985 Project" because of the date. (refer to the same above)

buildings, the procurement of education equipment and training of teachers and management staff in Japan, thereby contributing to regional vitalization, and support for market economy reform and environmental conservation.

The target 8 Universities were: 1) Beihua University, 2) Changchun University of Science and Technology, 3) Changchun University of Technology, 4) Changchun Institute of Technology, 5) Changchun University of Chinese Medicine[3], 6) Jilin Agricultural University, 7) Jilin Teachers' Institute of Engineering and Technology and 8) Tonghua Normal University.

Loan Approved Amount/ Disbursed Amount	4,530 million yen / 4,441 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March, 2003 / March, 2003
Terms and Conditions	Interest Rate: 2.2% (0.75% for training portion) Repayment Period: 30 years (40 years for training portion) (Grace Period) (10 years) Conditions for Procurement: General Untied
Borrower / Executing Agency(ies)	Government of the People's Republic of China / Jilin Provincial People's Government
Final Disbursement Date	January, 2012
Feasibility Studies, etc.	1) "Utilization of Loan in Japanese Yen by Jilin Province Higher Learning Institutions for Talents Cultivation" Feasibility Study, Jilin Province Project Consultancy Company, dated October 2002 2) Special Assistance for Project Implementation to Inland Higher Education Project in China, dated May 2005

2. Outline of the Evaluation Study

2.1 External Evaluator

Oita Hiroshi, OPMAC Corporation

2.2 Duration of Evaluation Study

Duration of the Study: August, 2013 – November, 2014

Duration of the Field Study: October 29, 2013 – November 12, 2013

March 10, 2014 – March 15, 2014

[3] In 2006 Changchun College of Traditional Chinese Medicine changed its name to Changchun University of Chinese Medicine after approval by the Ministry of Education.

3. Results of the Evaluation (Overall Rating: A[4])

3.1 Relevance (Rating: ③[5])

3.1.1 Relevance to the Development Plan of China

At the time of appraisal it was noted that, as a national target in the 10th 5 Year Plan (2001-2005), the enrolment rate[6] of higher education would increase to around 15% in 2005. The 10th 5 Year Plan of Jilin Province also aimed to raise the enrolment rate of higher education to 20%. In reality, the enrolment rate of China was 15% in 2002 and 26.5% in 2010. In Jilin Province the rate reached 28% in 2005 and 37% in 2011.

At the time of the ex-post evaluation, it was confirmed that the 12th 5 Year Plan of the National Education Project (2011-2015) set the targets of a 36% enrolment rate of higher education in 2015 and 40% in 2020. In Jilin Province, the enrolment rate of higher education will be raised from 41% in 2012 to 55%[7] in 2015. Since China has been strengthening technical innovation and high technology in the 12th 5 Year Plan (2011-2015), human resource development remains one of the important policy measures in higher education.

3.1.2 Relevance to the Development Needs of China

At the time of appraisal the need for higher education in China has been expanding in tandem with the spread of compulsory education for 9 years, which was established in 1986. In Jilin Province intake rate at primary and junior secondary schools was substantially 100% and intake rate at senior secondary schools[8] was 45.2% in 2001. This rate has been increasing year by year and it was 98% in 2012, which means that almost all students at junior secondary schools went on to senior secondary schools (Table 1). The policy target mentioned above and the expansion of the Universities quota corresponding to this policy and social needs of higher education resulting from economic development were thought to be the reason for the increase in enrolment in higher education.

Based on the national and provincial policies for higher education and the needs as described above, the target Universities will continue to play an important role as the key universities in Jilin Province for the development of human resources. From this point of view the Project is consistent with development needs.

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

[5] ③: High, ② Fair, ① Low

[6] "enrolment rate" means the ratio of the number of students in higher education institutions against the population between the age 18 and 22.

[7] According to the 12th 5 Year Plan of Education Development Project of Jilin Province (2011-2015), the target enrolment rate in 2015 was initially set at 40% but since this target was achieved in 2012 as 41%, the education department has reset its internal target as 55%.

[8] In China, that which corresponds to a junior high school in Japan is called a "junior secondary school". A high school is called a "senior secondary school".

Table 1: Achievements and Targets of Education in Jilin Province

Unit: %

	2001	2005	2012	2015 (Target)
Primary school intake rate	99.7	99.9	99.8	100
Junior secondary school intake rate	98.3	99.2	99.3	100
Senior secondary school intake rate	45.2	61.5	98	99
Higher education (university) enrolment rate	16.7	28	41	55

Source: Jilin Province Education Department

3.1.3 Relevance to Japan's ODA Policy

The Japanese government set out its "Economic Cooperation Program for China" in October 2001, which showed the direction of ODA towards China as follows:

1) Cooperation for the resolution of environmental and other global issues;
2) Assistance for Open and Reform Policy (assistance for encouraging stronger ties between the Chinese and international economies);
3) Promotion of mutual understanding (strengthening of i) the dispatch of experts to China, ii) the acceptance of trainees from China, iii) support for Chinese students studying in Japan, iv) youth exchange v) cultural exchange programs, vi) academic exchange and vii) university-level exchange programs; the preparation of an environment for receiving overseas students; and policy recommendations and human capacity development to promote tourism etc.);
4) Assistance for poverty alleviation;
5) Support for private sector activities; and
6) Promotion of multilateral cooperation.

Among the above the Project contributed to dealing with 1) cooperation for the resolution of environmental and other global issues, 2) assistance for Open and Reform Policy and 3) promotion of mutual understanding. Thus it can be said that the Project was consistent with the policy of the Japanese government.

In light of the above, the Project has been highly relevant to the country's development plan and development needs, as well as to Japan's ODA policy. Therefore, its relevance is high.

3.2 Effectiveness[9] (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

At the time of the appraisal, the operation and effect indicators were 1) an increase in the number of students enrolled in the 8 Universities and 2) an increase in the enrolment rate for higher education in Jilin Province. Whereas the scope of the Project covered the procurement of

[9] Sub-rating for Effectiveness is to be included in the consideration of Impact.

equipment for education and research as well as training in Japan, there is no direct relationship between the Project and the indicators. Therefore in addition to these indicators, the monetary value of education and research equipment, the monetary value of equipment per student and the operational rate of equipment were analyzed from the point of view of quantity. From the quality point of view, the floorage per student for the education environment, and the number of key disciplines and key laboratories, the number of research projects, the number of research papers and the number of master and doctor courses were analyzed for the level of education and research.

3.2.1.1 Improvement in Quantity

(1) Number of Students and Enrolment Rate

An increase of 37 thousand students and an enrolment rate of 21% were estimated as the original target for the year of completion of 2006. The actual increase in the number of students was 44 thousand and the enrolment rate was 29% in 2006, both of which exceeded the original estimate (Table 2 and Table 3). At the time of the ex-post evaluation, it was confirmed that the total number of students for the 8 Universities was 125 thousand in 2012, an increase of 12 thousand from 2006. The enrolment rate also increased to 41% in 2012 which indicates a higher popularity of higher education.

Table 2: Increase in the Number of Students

Unit: 1,000 people

Number of Students in the 8 Universities	Baseline 2001 actual	Target 2006 (Year to be completed)	Increment form 2001	Actual 2012 (Year of completion)
Target	-	105	37	-
Actual	69	113	44	125

Source: JICA appraisal data and Department of Education in Jilin Province

Table 3: Rise in the Enrolment Rate of Higher Education Institutions

Unit: %

Enrolment rate of higher education in Jilin Province	Baseline 2001 Actual	Target 2006 (Year to be completed)	Actual 2012 (Year of completion)
Target	-	21	-
Actual	16.9	29	41

Source: JICA appraisal data and Department of Education in Jilin Province

The increase in the number of students as well as in the enrolment ratio were in accordance with the policy measures for the quantitative expansion of higher education as mentioned in "3.1 Relevance" above. Although the increase in the figures for each University varied depending upon the total floorage and the number of teachers, almost all the Universities had exceeded the original target in 2006. At the time of the ex-post evaluation it was also found that the number of students had further increased by 2012 (Table 4).

Table 4: Number of Students in each University

Unit: 1,000 people

	Baseline a. 2001	Target b. 2006	Increment (b-a)	Actual c. 2006	Increment (c-a)	Actual d. 2012	Increment (d-c)
Beihua University	15.8	20.9	5.1	21.3	5.5	23.4	2.1
C.U of Science & Technology	10.7	17.2	6.6	19.1	8.4	20.8	1.7
C.U of Technology	11.5	14.6	3.1	17.7	6.2	18.8	1.0
C. Institute of Technology	10.4	13.4	3.0	13.7	3.3	14.0	0.3
C.U of Chinese Medicine	3.7	7.5	3.8	7.3	3.6	10.3	3.1
Jilin Agricultural University	8.5	17.0	8.5	17.3	8.8	18.1	0.7
Jilin Teachers' Institute of E &T	4.3	7.4	3.1	7.6	3.3	8.5	0.9
Tonghua Normal University	4.0	7.1	3.1	8.6	4.7	11.2	2.6
Total	68.9	105.1	36.3	112.5	43.7	124.9	12.4

Note: C: Changchun, C.U: Changchun University, E&T: Engineering and Technology
Source: JICA appraisal data (2001) and answers to questionnaires from each University (2006 and 2012)
Note: The result of figures added or subtracted sometimes differ due to round off.

(2) Amount of Education and Research Equipment

From the view point of Project effectiveness, since the main target of the Japanese ODA loan was to supply equipment, 1) the share of the amount for equipment provided by the Japanese ODA loan over the total amount of equipment in each University and 2) the amount of equipment per student in each University were studied in order to confirm the effectiveness of the supply of equipment from the point of view of improvement of the quantitative aspect. Data collected from each University showed that the share of equipment provided under the Project was 16.2% on average in 2012 (Table 5). This implies that the equipment procured under the Project played an important role in education and research at the Universities.

Table 5: Total Amount of Equipment in the Universities

Unit: 1,000 RMB

	2006	2012		b/a (%)
		a. Total amount of equipment	b. Amount of equipment procured by yen Loan	
Beihua University	168,660	260,780	59,680	22.9
C.U of Science & Technology	207,620	415,840	32,230	7.8
C.U of Technology	98,020	253,960	42,740	16.8
C. Institute of Technology	135,290	248,120	40,380	16.3
C.U of Chinese Medicine	69,530	138,220	54,770	39.6
Jilin Agricultural University	136,440	342,590	28,680	8.4
Jilin Teachers' Institute of E &T	60,260	98,450	21,310	21.6
Tonghua Normal University	42,040	96,200	20,770	21.6
Total	917,860	1,854,160	300,560	16.2
Average	114,730	231,770	37,570	16.2

Source: Answers to questionnaires from each University
Note: There were no base and target figures set at the time of appraisal

With regard to the amount of equipment per student, compared to the amount at the time of the appraisal in 2001, the amount had increased not only by the target year of 2006 when the construction of buildings in the Universities was complete, but also by 2012 when the Project was completed (Table 6). This means that students had more chance to use the equipment. Although it is difficult to measure appropriately the effectiveness of the Project in terms of the use of equipment by students, it can be said that equipment provided by the Project has been well used considering the quite high rate of usage for major equipment, even in 2012 (Table 7). At the time of the ex-post evaluation it was confirmed through hearings with teachers and site visits that equipment provided by the Project showed a high usage rate and that most equipment was used even now in all the Universities, contributing sufficiently to education and research[10].

Table 6: Amount of Equipment per Student

Unit: RMB

	2001	2006	2012
Beihua University	4,800	7,478	10,609
C.U of Science & Technology	5,469	5,984	14,973
C.U of Technology	1,533	4,000	9,400
C. Institute of Technology	5,321	8,110	15,359
C.U of Chinese Medicine	654	8,000	13,822
Jilin Agricultural University	5,027	8,179	13,316
Jilin Teachers' Institute of E &T	2,699	5,966	9,272
Tonghua Normal University	1,897	4,234	5,538

Source: JICA appraisal data (2001) and answers to questionnaires from each University (2006 and 2012)

Table 7: Rate of Usage of Equipment

Unit: %

2012 (1)	2012 (2)
100	95
98	96
98	100
100	100
95	98
98	95
98	95
97	100

Source: Answers to questionnaires from each University
Note: Equipment in use
(1) at price base, (2) rate of operation

Japanese made processing machine for experiments at Changchun University of Technology

3.2.1.2 Improvement in Quality

(1) Floorage per Student

With regard to the quantitative effects of the Project, changes in the floorage per student

[10] Many computers were included among the equipment. Even after 5 years following the installation of these computers, many are still used for education purposes.

were studied from the viewpoint of improvement of the study environment, in the qualitative aspect. Whereas the scope of the Project consisted of the procurement of equipment and training, each University expanded its buildings using local funds. At the time of the appraisal only Beihua University planned to expand its school buildings[11] although all the other Universities had also expanded floorages using their own funds or the budget from the province (Table 8). From historical data of the floorage of each University, it can be seen that the Universities expanded their school buildings continuously and on a large scale to 2012, even after the target year of 2006. This expansion, funded by the Universities themselves, was a precondition for effective use of the equipment procured under the Project.

Table 8: Total Floorage of School Buildings

Unit: m^2

	2001	2006		2012
		Target	Actual	
Beihua University	138,382	217,187	294,530	793,377
C.U of Science & Technology	86,885	234,885	644,861	637,000
C.U of Technology	171,434	220,376	256,415	420,078
C. Institute of Technology	125,840	180,840	163,153	463,367
C.U of Chinese Medicine	44,214	96,164	113,634	336,392
Jilin Agricultural University	94,636	143,636	187,133	754,860
Jilin Teachers' Institute of E &T	51,347	72,247	70,410	188,796
Tonghua Normal University	30,411	63,011	57,912	285,142
Total	743,149	1,228,346	1,788,048	3,879,012

Source: JICA appraisal data (2001, 2006 target) and answers to questionnaires from each University (2006 actual and 2012)
Note: School buildings include class rooms, rooms for experiments libraries, gymnasiums, halls, etc.

With regard to the floorage per student, 5 Universities out of the 8 met the target in the target year of 2006. In 2012 the figure had improved further. However, the baseline of the floorage per student set by the Ministry of Education in 2006 was not less than $30m^2$. The number of the Universities which had already met this target in 2012 was 5 out of 8 (Table 9). Although the education environment for students has

Table 9: Floorage per Student

Unit: m^2

	2001	2006		2012
		Target	Actual	
Beihua University	8.7	10.1	13.8	33.9
C.U of Science & Technology	7.6	12.0	33.8	30.6
C.U of Technology	14.6	13.8	14.5	22.4
C. Institute of Technology	12.1	13.5	11.9	33.1
C.U of Chinese Medicine	11.4	12.2	15.7	32.6
Jilin Agricultural University	10.8	8.0	10.8	41.8
Jilin Teachers' Institute of E &T	12.0	9.7	9.3	22.3
Tonghua Normal University	7.7	8.9	6.7	25.5
Average	10.5	11.1	15.9	30.3

Source: JICA appraisal data (2001, 2006 target) and answers to questionnaires from each University (2006 actual and 2012)

[11] At the time of appraisal, Beihua University had a plan to expand the facility by $9,800m^2$ which was included in the scope of the Project.

improved in terms of quantity as a whole, the improvement is not sufficient on the basis of individual Universities. There is still a need for each University to improve the education environment further.

(2) Research Opportunities and their Outcomes

By using equipment provided by the Project effectively, the level of education and research was raised. In order to measure the outcome of this improvement, increases in the number of key disciplines, key laboratories, research projects and papers were counted as indicators. The number of key disciplines, key laboratories and papers appearing in the Science Citation Index (SCI), which covers academic magazines and theses in the field of science and technology, were used as the basis for judging the outcome of education and research. The increases in key disciplines and key laboratories imply that the national or provincial government or the Department of Education have supported key education and research by injecting budget. This has led to the improvement in the level of education and research (Table 10 and Table 11). In addition, the increase in the number of research projects and the number of papers appearing in SCI showed that a lot of experiments had been made using the equipment and that the outcome of these experiments had been made public (Table 12 and Table 13). It is difficult to make a concrete evaluation of the extent to which the Project contributed to the increase, but the data showed that the numbers have increased in all the Universities since the appraisal up to the present. During this period it is estimated that equipment provided by the Japanese ODA loan was used for experiments and research. In particular it was a very good time for the Universities to improve their education and research systems during this period as the procurement of equipment and the training in Japan under the Project coincided with the increase in the number of students and the expansion of the campuses in the Universities.

Changchun University of Technology
Key Discipline

Key Discipline/Key Laboratory in Changchun University of Science and Technology

Table 10: Number of Key Disciplines

	2001	2006		2012 Actual
		Target	Actual	
Beihua University	NL: 0 PL: 4	NL: 2 PL: 12	NL: 1 PL: 6	NL: 1 PL: 6
C.U of Science & Technology	NL: 1 PL: 11	NL: 4 PL: 14	NL: 1 PL: 12	NL: 1 PL: 14
C.U of Technology	NL: 0 PL: 8	NL: 2 PL: 15	NL: 0 PL: 9	NL: 0 PL: 8
C. Institute of Technology	NL: 0 PL: 0	NL: 0 PL: 3	NL: 0 PL: 1	NL: 0 PL: 3
C.U of Chinese Medicine	NL: 0 PL: 5	NL: 1 PL: 7	NL: 0 PL: 8	NL: 0 PL: 22
Jilin Agricultural University	NL: 3 PL: 9	NL: 5 PL: 14	NL: 0 PL: 11	NL: 0 PL: 13
Jilin Teachers' Institute of E &T	NL: 0 PL: 0	NL: 0 PL: 2	NL: 0 PL: 1	NL: 0 PL: 3
Tonghua Normal University	NL: 0 PL: 1	NL: 0 PL: 5	NL: 0 PL: 1	NL: 0 PL: 3
Total	NL: 4 PL: 38	NL: 14 PL: 72	NL: 2 PL: 49	NL: 2 PL: 72

Source: JICA appraisal data (2001, 2006 target) and answers to questionnaires from each University (2006 actual and 2012)
Note: NL: National Level, PL: Provincial Level

Table 11: Number of Key Laboratories

	2006 Actual	2012 Actual
Beihua University	NL: 0 PL: 1	NL: 0 PL: 3
C.U of Science & Technology	NL: 1 PL: 1	NL: 1 PL: 10
C.U of Technology	NL: 0 PL: 1	NL: 1 PL: 11
C. Institute of Technology	NL: 0 PL: 0	NL: 0 PL: 2
C.U of Chinese Medicine	NL: 0 PL: 5	NL: 3 PL: 20
Jilin Agricultural University	NL: 0 PL: 14	NL: 1 PL: 19
Jilin Teachers' Institute of E &T	NL: 0 PL: 0	NL: 0 PL: 2
Tonghua Normal University	NL: 0 PL: 0	NL: 0 PL: 1
Total	NL: 1 PL: 22	NL: 6 PL: 68

Source: Answers to questionnaires from each University

Table 12: Number of Research Projects

	2001 Baseline	2006 Actual	2012 Actual
Beihua University	NL: n.a PL: n.a	NL: 2 PL: 89	NL: 11 PL: 124
C.U of Science & Technology	NL: 21 PL: 52	NL: 61 PL: 219	NL: 49 PL: 559
C.U of Technology	NL: 2 PL: 53	NL: 9 PL: 169	NL: 23 PL: 263
C. Institute of Technology	NL: n.a PL: n.a	NL: 0 PL: 11	NL: 3 PL: 53
C.U of Chinese Medicine	NL: 5 PL: 7	NL: 8 PL: 71	NL: 9 PL: 78
Jilin Agricultural University	NL: 8 PL: 22	NL: 38 PL: 43	NL: 69 PL: 143
Jilin Teachers' Institute of E &T	NL: 0 PL: 2	NL: 4 PL: 49	NL: 10 PL: 62
Tonghua Normal University	NL: 2 PL: 12	NL: 6 PL: 60	NL: 6 PL: 68

Source: Answers to questionnaires from each University

Table 13: Papers published in SCI

	2001	2006	2012
Beihua University	14	74	265
C.U of Science & Technology	12	109	330
C.U of Technology	8	47	276
C. Institute of Technology	1	48	139
C.U of Chinese Medicine	3	12	16
Jilin Agricultural University	n.a	22	241
Jilin Teachers' Institute of E &T	26	38	54
Tonghua Normal University	2	29	34

Source: Answers to questionnaires from each University

(3) Status of Master Courses and Doctor Courses

The equipment provided by the Project is also used for education and research in post-graduate courses. The establishment and upgrading of post-graduate courses leads to a development of human resources with a higher level and thus becomes one of the targets of universities. The current status of the post-graduate courses in the Universities is shown in Table 14 and Table 15.

Table 14: Number of Master Courses

	2001	2006	2012
Beihua University	16	38	56
C.U of Science & Technology	23	44	83
C.U of Technology	14	22	69
C. Institute of Technology	0	0	13
C.U of Chinese Medicine	14	22	25
Jilin Agricultural University	23	47	76
Jilin Teachers' Institute of E &T	0	0	0
Tonghua Normal University	0	3	3
Total	90	176	325

Source: JICA appraisal data (2001), answers to questionnaires from each University (2006 and 2012) and Jilin Province Education Department

Table 15: Number of Doctor Courses

	2001	2006	2012
C.U of Science & Technology	4	11	25
C.U of Chinese Medicine	0	2	10
Jilin Agricultural University	5	13	21
Total	9	26	56

Source: JICA appraisal data (2001), answers to questionnaires from each University (2006 and 2012) and Jilin Province Education Department
Note: There is no doctor course in the other Universities

3.2.2 Quantitative Effect[12]

(1) Realization of Practical and Higher Education and Research

The equipment for education and research procured under the Project enhanced experiments and training in the Universities, and enabled research at a higher level, mainly in the field of engineering. Such education and research in the post-graduate courses as well as co-research with industries contributed to human development in line with the purpose of the Project as well as to regional vitalization, support for market economy reform and environmental conservation. Reports on the utilization of equipment and on the participants who attended training are listed in Attachment 1.

(2) Improvement of Education Methods

One of the components of the Project was training in Japan. There were teachers who learned Japanese teaching methods and applied these to their own classes. In particular, interest in presentations made by individual students in a seminar style and study by groups with different themes became a trigger for changing teaching methods from lecture-centered education to student-centered education. In addition, the hearings from teachers at the time of the ex-post evaluation made it clear that teachers could utilize the equipment more effectively after their return from training in Japan where they were able to learn methods of experiment using the equipment procured by the Japanese ODA loan.

3.3 Impact

3.3.1 Intended Impacts

(1) Influence on Higher Education in Jilin Province

The 8 Universities under the Project are those which were given priority in Jilin Province. At the time of the appraisal there were 36 higher education institutions, and this number increased to 58 in 2012. Concerning the number of students, students at the 8 Universities constituted nearly 30% of the total number of students in the province (Table 16). The data did not tell us whether or not the Project had had any impact on higher education in the province through the 8 Universities. The Universities have different characteristics. There are science oriented universities (Changchun University of Science and Technology, Changchun University of Technology, Changchun Institute of Technology), teaching oriented universities (Jilin Teachers' Institute of Engineering and Technology, Tonghua Normal University) and a medical university (Changchun University of Chinese Medicine). It can be said that the Project has had a certain influence on higher education through papers published in the respective areas.

[12] The quantitative effect was confirmed through interviews with the 8 Universities. In each University explanations were given by vice presidents, deans, participants in training, and people in charge of operation and maintenance of equipment and heads of university management.

Table 16: Indicators of Higher Education in Jilin Province

Indicator	2001	2006	2012
(1) Number of higher education institutions	36	43	58
(2) a. Number of students in higher education institutions (1000 people)	248	378	522
b. Number of students in the 8 Universities (1000 people)	69	113	125
b/a (%)	28	30	24
(3) Enrollment rate of higher education (%) (=Number of enrolled of relevant age/ Number of population of relevant age)	17	29	41
(4) Floorage per Student (m^2/person) (=Total floorage/Total number of students)	29	34	39
Same in the 8 Universities (m^2/person)	11	16	30

Source: Jilin Province Education Department and answers to questionnaires from each University

(2) Contribution to Regional Vitalization, Support for Market Economy Reform and Environmental Conservation

Regional vitalization, support for reform of the market economy and environmental conservation, which are listed as impacts of the Project have been achieved through research at the Universities or by graduates who studied in the Universities. For example, at Beihua University there have been about 20 thousand graduates for the last 7 years who studied subjects related to the major industries in Jilin Province such as metallurgy, chemical industry, pharmacy, medicine, mechanical engineering, biology and architecture. The Changchun University of Chinese Medicine has contributed a lot to the region in the areas of nursing, medicine and medical treatment. The Universities also use equipment procured under the Project in their vocational education and adult education and this has enhanced the technical capacity of students who attended the courses. Although it is difficult to see actual individual examples which show this contribution, it can be said that the Project as a whole has contributed to the province through the increase in the enrollment rate, the improvement in the education environment, the increase in publications in official papers, and the application of advanced teaching and research technology acquired through training in Japan, as mentioned above.

3.3.2 Other Impacts

(1) Impacts on the Natural and Social Environment

It was confirmed at the time of the appraisal of the Project that the Department of Education had received the approval of the Environment Protection Department of Jilin Province for its Environmental Impact Assessment before implementation of the Project. Since the Project was composed mainly of equipment, there was nothing that affected the natural or social environment during implementation of the Project. Even the expansion of buildings and other construction works for the installation of large equipment were conducted within the boundary of the Universities. Therefore there was no resettlement in this Project. After the instalment of equipment, there was no issue of environmental pollution through the use of the

equipment. With regard to the construction of buildings in the Universities which was not a component of the Japanese ODA loan, there were also no environmental problems of land acquisition or environment, including resettlement, as from the beginning the construction took place only within the University areas.

(2) Agreements with Japanese Universities

Agreements with Japanese universities were concluded by 4 Universities as mentioned in Table 17. Since the Changchun University of Technology already had exchange with Niigata University of Management before starting the Project, it sent its staff and teachers to Niigata University of Management for training in university management under the Project. This arrangement made the relationship between the two universities stronger. In another example of exchange, Changchun University of Chinese Medicine signed an agreement with Niigata University of Pharmacy and Applied Life Science during the implementation period of the Project and sent staff there for training. In cases such as these the Project contributed directly and indirectly to the strengthening of ties or the promotion of agreements.

Table 17: Agreements with Japanese Universities

Name of University	Japanese Counterpart University and Agreement Date
C.U of Science & Technology	Nagasaki University of Foreign Studies, September 2008
C.U of Technology	Niigata University of Management, October 1999
C.U of Chinese Medicine	Niigata University of Pharmacy and Applied Life Science, September 2007
	Tokyo University of Pharmacy and Life Science, May 2013
Jilin Agricultural University	Fuji University, November 2002
	University of Tsukuba, February 2009
	Iwate University, September 2011

Source: Answers to questionnaires from each University

As can be seen above, this Project has largely achieved its objectives. Therefore its effectiveness and impact are high.

3.4 Efficiency (Rating:②)

3.4.1 Project Outputs

The procurement of education and research equipment and training in Japan were covered by the Japanese ODA loan under the Project. Expansion of school buildings was included in the scope of the Project only at Beihua University. However, the cost of the expansion was financed through the provincial budget or the budget of the University itself. Other Universities also expanded their buildings but the expansion was not explicitly included as part of the scope of the Project at the time of the appraisal (refer to Table 8). Beihua University had planned to expand its floorage by 9,800 m^2 but this was reduced to 5,511m^2 as it was necessary to maintain an evacuation passage in the said area. Later the University expanded its floorage further using

its own resources. Therefore the final increase in floorage was more than that which was within the scope of the Project.

The education equipment was procured based on a request list submitted by each University. Changes were made to the technical specifications of equipment for which the technology changes rapidly like computers at the bidding or contract stage. As a whole, the procurement of equipment was in accordance with the original plan. With regard to the number of participants in training, this was 177 at the time of the appraisal, although the actual number turned out to be 176, almost as planned. However, the training period was shorter than in the original plan. The reason for this difference was that it took time to gather information on Japanese universities and because the teachers could not take long periods of leave for training due to their campus duties. There were no Japanese teachers dispatched to the Universities using the Japanese ODA loan funds, but some Japanese teachers were received using the funds of Universities themselves, or they were dispatched using the funds of the Japanese universities; for example lectures on material technology in Changchun University of Technology, and the case of Japanese language teachers in Tonghua Teacher's College. Out of 176 participants, 93 took courses in the administration and management of universities and most of these (78 participants) visited Ritsumeikan University in Japan for that purpose. Many participants took this course which Ritsumeikan University had established for the Project (Table 18) .

Table 18: Number of Participants in Training

Name of University	Plan	Actual	
	Total	Total	Of which administration training
Beihua University	33	31	9
C.U of Science & Technology	21	9	4
C.U of Technology	23	33	26
C. Institute of Technology	19	34	29
C.U of Chinese Medicine	37	31	9
Jilin Agricultural University	20	22	8
Jilin Teachers' Institute of E &T	14	8	3
Tonghua Normal University	10	8	5
Total	177	176	93

Source: Jilin Province Education Department and answers to questionnaires from each University

3.4.2 Project Inputs

3.4.2.1 Project Cost

The total project cost was originally planned at 5,707 million Japanese yen of which the ODA loan amount was 4,530 million Japanese yen. The actual project cost was 4,585 million Japanese yen of which the ODA loan amount was 4,441 million Japanese yen. The actual project cost was 80% of the original total and 98% of the Japanese ODA loan total, both of which were within the limits of the plan. The foreign currency portion of the Project was used for education equipment and training and all of this was covered by the Japanese ODA loan. At the planning stage, the installation and other incidental expenses for the equipment were to be covered by local budgets but in reality all these expenses were covered by the foreign currency

portion of the contract. With regard to the construction costs of building in Beihua University, local budget was appropriated to cover all the construction costs. The other Universities also constructed buildings using their own budgets but this construction was not included in the scope of the Project. (Table 19, Table 20)

Table 19: Planned Project Cost

Unit: million Japanese yen

Item	Foreign Currency		Local Currency		Total	
	Total	Of which Japanese ODA Loan	Total	Of which Japanese ODA Loan	Total	Of which Japanese ODA Loan
Building Construction	0	0	255	0	255	0
Education/Research Equipment	4,045	4,045	866	0	4,911	4,045
Personnel Training	175	175	0	0	175	175
Price Escalation	94	94	1	0	95	94
Physical Contingency	216	216	55	0	271	216
Total	4,530	4,530	1,177	0	5,707	4,530

Source: JICA appraisal data

Table 20: Actual Project Cost

Item	Foreign Currency (million yen)		Local Currency (million RMB)		Total (million yen)	
	Total	Of which Japanese ODA Loan	Total	Of which Japanese ODA Loan	Total	Of which Japanese ODA Loan
Building Construction	0	0	10.4	0	144	0
Education/Research Equipment	4,300	4,300	0	0	4,300	4,300
Personnel Training	137	137	0	0	137	137
Disbursement Charges	4	4	0	0	4	4
Total	4,441	4,441	10.4	0	4,585	4,441

Source: Jilin Province Education Department; Data provided by JICA
RMB: Ren Min Bi
Note: The "Disbursement Charges" are charged to the borrower at the time of disbursement by JICA at 0.01% of the disbursed amount. There were covered by the loan.

The amount for education equipment procured was 255 million Japanese yen more than in the original plan. This was due to changes in part of the specification of the equipment and was also the result of additional procurement for equipment to be used in the new library at Changchun University of Chinese Medicine (Table 21) .

Table 21: Cost of Equipment in each University

Unit: million Japanese yen

	Plan	Actual
Beihua University	899	857
C.U of Science & Technology	569	566
C.U of Technology	466	535
C. Institute of Technology	527	601
C.U of Chinese Medicine	609	781
Jilin Agricultural University	426	400
Jilin Teacher's Institute of E &T	275	281
Tonghua Normal University	273	280
Total	4,045	4,300

Source: Jilin Province Education Department
Note: The results of addition differ due to round off.

3.4.2.2 Project Period

Although the loan agreement of the Project was concluded in March 2003, the starting point of the Project was set in January 2003 when construction began on school buildings at Beihua University. The original implementation period was 39 months from January 2003 to March 2006, whereas the actual implementation period was 108 months, ending in December 2011 with the completion of installment for additional procurement. This was 277% of the original schedule and thus significantly longer than planned (Table 22) .

Table 22: Implementation Period

	Original Plan	**Actual**
Building Construction	January 2003 – September 2003	January 2003 – December 2006
Education/Research Equipment	April 2003 – December 2005	April 2003 – December 2011
Personnel Training	April 2003 – March 2006	April 2003 – November 2010
Project Period	January 2003 – March 2006 (39 months)	January 2003 – December 2011 (108 months)

Source: Answers to questionnaires from each University

The original disbursement period of the Project ended in July 2010 but the period was extended for one year and 6 months to January 2012 because the installation of equipment and the dispatch of trainees to Japan had not been completed. The delay in procurement was caused by the time consuming process of the preparation of bidding packages, and bidding by each University did not take place. It took time to make decisions on the specifications of equipment, on the packaging[13] of the same kind of equipment for a bid while collecting requests from all the Universities, and on the preparation of bidding documents. It was also necessary to revise the specifications of some of the equipment because of the delay in bidding. The delay in training was caused by the selection of Japanese universities appropriate for the specialties of trainees, by the Great Sichuan Earthquake (May 2008) and by a new type of influenza, all of which meant it took time for dispatch added to which were the strict formalities for overseas trips and the postponement of trips.

3.4.3 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 possible.

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

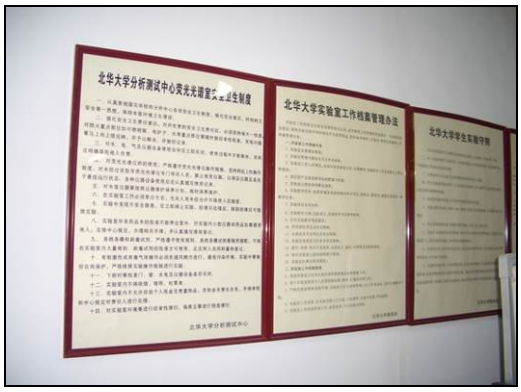
[13] There were 15 packages in total and the bidding was made by each package.

3.5 Sustainability (Rating: ③)

3.5.1 Institutional Aspects of Operation and Maintenance

The maintenance of equipment procured by the Project is the responsibility of the office of assets or the office of equipment in each University. These offices label the equipment, sometimes with a bar code for inventory control, post important notices for the use of the equipment in each room and assign people in charge of the operation and maintenance of the equipment. The people assigned to the operation and maintenance of the equipment are usually the teachers or researchers who use the equipment. In some cases they keep operation records for the equipment. The provincial education department monitors the Universities and the Universities are obliged to report on the condition of their assets conditions regularly. In this way the operation and maintenance system is established not only in each University but between the Universities and the province.

Barcode for inventory management in Changchun University of Chinese Medicine



Operation and management rules posted in Beihua University

3.5.2 Technical Aspects of Operation and Maintenance

Since experts such as the teachers or researchers who use the equipment are responsible for the equipment, minor repairs are done by these experts themselves. At the end of the guarantee period of equipment, the Universities ask suppliers to conduct regular maintenance and major repairs which the experts in the Universities cannot handle. According to the hearings at the Universities, there was no serious problems at the time of the ex-post evaluation as the Universities continued to receive technical support for the equipment from the suppliers.

3.5.3 Financial Aspects of Operation and Maintenance

The operation and maintenance costs for the equipment are covered by the university budget. A certain level of operation and maintenance budget is secured by each University (Table 23). In addition, subsidies from the provincial government and commission fees from industries are used for operation and maintenance. Since the income of each University has been stable and the provincial budget for higher education has been increasing, there seems to have

been no shortage in expenditure for operation and maintenance. With regard to the depreciation of equipment, although the operation period of the equipment is set, the equipment will be used as long as it works without consideration made to depreciation.

Table 23: Income and Expenditure of the Universities

Unit: RMB1,000

	2010	2011	2012
Beihua University	income: 486,540 outlay: 429,190 (O/M:810)	income: 491,440 outlay: 401,650 (O/M:920)	income: 733,280 outlay: 661,540 (O/M:830)
C.U of Science & Technology	income: 421,750 outlay: 365,490 (O/M:14,340)	income: 1042,680 outlay: 1018,650 (O/M:13,580)	income: 913,180 outlay: 637,920 (O/M:9,700)
C.U of Technology	income: 318,420 outlay: 306,770 (O/M:3,000)	income: 427,320 outlay: 449,430 (O/M:3,000)	income: 497,430 outlay: 461,560 (O/M:3,800)
C. Institute of Technology	income: 256,430 outlay: 237,130 (O/M:3,100)	income: 299,010 outlay: 298,290 (O/M:3,200)	income: 380,600 outlay: 347,250 (O/M:3,300)
C.U of Chinese Medicine	income: 198,660 outlay: 169,640 (O/M:N/A)	income: 296,970 outlay: 299,790 (O/M:N/A)	income: 365,590 outlay: 325,360 (O/M:N/A)
Jilin Agricultural University	income: 970,650 outlay: 864,770 (O/M:1,050)	income: 837,860 outlay: 547,240 (O/M:1,220)	income: 679,450 outlay: 589,380 (O/M:1,110)
Jilin Teachers' Institute of E &T	income: 134,930 outlay: 121,650 (O/M:300)	income: 141,280 outlay: 138,860 (O/M:380)	income: 215,640 outlay: 150,050 (O/M:400)
Tonghua Normal University	income: 133,190 outlay: 115,840 (O/M:2,540)	income: 195,380 outlay: 186,880 (O/M:4,320)	income: 227,530 outlay: 197,090 (O/M:23,040)

Source: Answers to questionnaires from each University
Note: O/M: Operation and Maintenance (the figures in parenthesis are included in the outlay total)

3.5.4 Current Status of Operation and Maintenance

Since each University has set up a firm operation and maintenance system, the equipment has been kept in a good condition. The ex-post evaluation mission confirmed at the site survey that rooms where the equipment is installed and their surroundings were kept clean and neat. This may be because the instructions of administrators were fully disseminated. The equipment was installed more than 5 years ago, but even the old type of computers are still used for education. Therefore the condition of equipment remains good.

Old type computers still used in Tonghua Normal University

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

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objective of this Project was to improve the quality and quantity of higher education in the designated 8 Universities under the Education Department of Jilin Province, by providing equipment and training for teachers and administration staff through the Japanese ODA loan and by expanding the facilities of the Universities through the provincial budget and the internal funds of the Universities. The Project was implemented based on the development policy for higher education in China and met the high needs of higher education. The Project was also consistent with Japanese ODA policy to China, and therefore the relevance of the Project is high. It was also noted that the timely arrangement of the procurement of equipment and training in Japan under the Project increased the opportunities for experiments and research which led to an increase in the number of academic papers. Thus, effectiveness and impact of the Project are high. With regard to the project cost, the procurement of equipment and training were implemented almost as planned within the original budget. However, the implementation period was far beyond the planned period because of delays in both training and procurement. Because of this, the efficiency of the Project is fair. The equipment procured has been well maintained from the point of view of the institutional, technical and financial aspects of each University. Even at the time of ex-post evaluation, the equipment is well operated and maintained and kept in a very good condition. The sustainability of the Project is therefore regarded as high.

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

4.2 Recommendations

None

4.3 Lessons Learned

"Consideration of an Efficient Procurement Method for Education Equipment"

In this Project, the education equipment was originally to be procured by each University but later this was changed to the procurement of the same kind of equipment for all the Universities through bidding on a package basis. As a result it took time to complete the bidding packages based on the request from all the Universities and to install the equipment in each University after bidding. This was economical from the procurement cost aspect but not efficient from the point of view of speedy procurement as the longer procurement time resulted in the obsolescence of specifications. Therefore the discretion to make their own decisions on the part of each University should be respected and consultation on efficient procurement methods should be made at the time of appraisal, not only with executing agencies like the education department but also with the institutions that use the equipment.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1. Project Outputs	8 universities in Jilin Province	Same as planned
(1) Construction of Buildings (using provincial and university funds)	9,800m^2 in Beihua University	5,511m^2 in Beihua University and more in other 7 Universities
(2) Education Facilities	Equipment for education, experiments and research	Same as planned
(3) Training	Total 177 participants	Total 176 participants
2.Project Period	January 2003 – March 2006 (39 months)	January 2003 – December 2011 (108 months)
3.Project Cost		
Amount paid in foreign currency	4,530 million yen	4,441million yen (Note 1)
Amount paid in local currency	1,177 million yen (78.5 million RMB)	144 million yen (10.4 million RMB)
Total	5,707 million yen	4,585 million yen
Japanese ODA loan portion	4,530 million yen	4,441 million yen
Exchange rate	1 RMB = 15 yen (As of September 2002)	1 RMB = 13.8 yen (Average between 2003 and 2006) (Note 2)

RMB: Ren Min Bi
Note 1: The actual amount paid in local currency is the cost for construction of 5,511m^2
Note 2: The exchange rate between the RMB and the Japanese yen is the average rate related to the period of construction of buildings in Beihua University

Attachment 1

Comments on Equipment procured by the ODA Loan and on Training in Japan

University	Comments
Beihua University	● The facilities in the construction engineer training center are used for the human resource development of students and post graduates, research by professors, innovation activities and the enhancement of the practical capacity of students. ● Innovation activities of students using the facilities procured through the Japanese ODA loan resulted in their winning second prize at the national level and third prize at the provincial level in the 2009 University Student Electronic Contest.
Changchun University of Science & Technology	● A part of the facilities is used for the tests entrusted to the university by outside entities. This helps revitalize the local economy. ● Fluorescence spectrophotometer has played an important role in education and scientific research. For the purpose of using this equipment in the division of materials, an experiment project, the "measurement of luminescence performance of materials" was added to the course related to the physical performance of materials. The equipment also contributed to the preparation of graduation theses, scientific innovation activities, and the finalization of theses for degrees. The number of treatises which were open to public was more than 10. Teachers carried out 8 national and provincial scientific projects using the equipment and published 20 or more treatises.
Changchun University of Technology	● The teachers who underwent training in Japan participated in the installation, adjustment and preparation for new experiments with the equipment procured by the Japanese ODA loan after their return home as well as being actively involved in the effective use of the equipment.
Changchun Institute of Technology	● The Project accelerated improvements in the environment for practical education, human development and scientific research. The equipment introduced through the Project raised the capacity of the laboratories to a much higher level, improved the environment for human development, and deepened the education contents, methods and means. As a result, the capacity of students for practice, innovation and technology was enhanced. This improvement in human quality made the competitiveness of students in the market much better after their graduation. ● The trainees made good use of their knowledge and experience in the daily education and scientific research and adopted both Japanese advanced technology and management method in their field of expertise after their return from training in Japan
Changchun University of Chinese Medicine	● Through training in Japan participants upgraded their expertise by using advanced equipment and facilities and learned technology and management models of effective Japanese medical care. The participants gained inspiration for the modernization of research approaches and management models in Chinese medicine and pharmacy, and contributed to the improvement of education, scientific research, human development, school management, etc. at the university.
Jilin Agricultural University	● The University provided scientific research institutions and industries with technical support such as R & D for new products by using the advanced equipment and facilities introduced through the Project. This improved local economic growth. At the same time, the facilities continuously lifted the scientific research level of the University, the outcome of which is scientific technology used for actual production. ● The 15 teachers who participated in the training in Japan were young and were the backbone of the University. They are always in charge of regular courses and most of them teach students in a master or doctor courses. They were able to deepen their expertise through the training, which is reflected in approaches to experiments, methods of research and test methods. These teachers played an active role on the front line of education after their return from training. They initiated the outcomes of their training in Japan and stimulated willingness to learn on the part of students.
Jilin Teachers' Institute of Engineering and Technology	● Participants learned about the internal management of higher education institutions in Japan and could show an example for their own management. Training deepened the relations and friendship between the participants and Japanese teachers, as well as between the two universities, and built a basis for future interaction.
Tonghua Normal University	● The scanning electron microscope and the transmission electron microscope which were procured under the Project were used for research works for graduation theses and helped students develop their practical capacity. The teachers conducted scientific research using these sets of equipment and issued 3 SCI papers in their specialized areas.

Source: Answers to questionnaires from each University