People's Republic of China

Ex-Post Evaluation of Japanese ODA Loan Project
Xian Xianyang International Airport Terminal Expansion Project

External Evaluator: Yasuhiro Kawabata, Sanshu Engineering Consultant

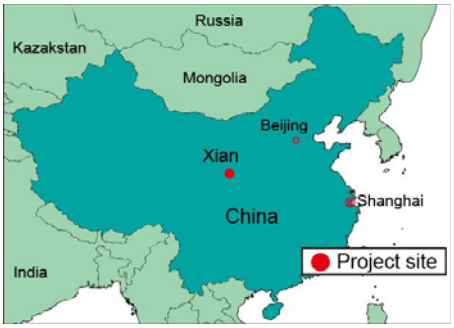
0. Summary

The project objective was to contribute to the enhancement of economic/commercial activities and trade in China's northwestern region through meeting the increasing traffic demand at the existing Xian Xianyang International Airport by constructing the new passenger terminal building and relevant facilities.

The project has been highly relevant with the Chinese and provincial development plans and needs, as well as Japan's ODA policies. Although the project cost was within the plan, the actual project period was much longer. Therefore, the efficiency is considered fair. Regarding its effectiveness, the project has largely achieved its development objectives (respond to the increasing passenger/cargo demand and contribution to the regional economy); therefore its effectiveness is considered high. Since there were no major problems observed in the operation and maintenance system, sustainability of the project is considered high.

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

1. Project Description



Project site

Xian Xianyang Airport No. 2 Terminal

1.1 Background

Since 1978, when the reform and open-door policies commenced, the transporting volume by air has substantially increased in China. The growth rate in terms of number of passengers by air was 18% per annum during the 10-year period from 1980 to 1990, and number of cargo by air was 15% per annum during the same period. The number of passengers has increased by 25% per annum and cargo by 22% per annum during the 5-year period from 1990 to 1995.

Despite the rapid increase in demand for passengers and air cargo, less progress has been made in the development of infrastructure, including airport facilities, such as the airport terminal and the control system, facilities around airports such as the water supply and sewage treatment system, roads/railways access to airport, and accommodation facilities around the airports in China. Construction and rehabilitation of airports, that would have enough capacity to handle the increasing demand, was considered a priority.

Xian is a provincial capital of Shaanxi province and it is the largest city in western China, with a total population of about 8.3 million (as of 2007). Before the reform and open-door policies commenced, the share of heavy industry in the industry sector was high and the local economy depended on special industry, such as the arms industry. However, the economic policy, encouraging the development of high-technology industry and conversion of industry, has been recently adopted. Since Xian Xianyang Airport was open to public in 1991, the volume of passengers and cargo by air has been increasing with the economic development. When the airport expansion plan was made, it was expected that the passengers by air would reach 2.24 million in 2000. However, the number of passengers reached 2.86 million in 1998, much higher than projected. Taking into account the current number of passengers, expansion of the airport facilities was a high priority in order to respond to the ever increasing traffic demand.

1.2 Project Outline

The project objective is to contribute to the enhancement of economic/commercial activities and trade in China's northwestern region through meeting the increasing traffic demand at the existing Xian Xianyang International Airport by constructing a new passenger terminal building and relevant facilities. The project plan is shown in Figure 1.

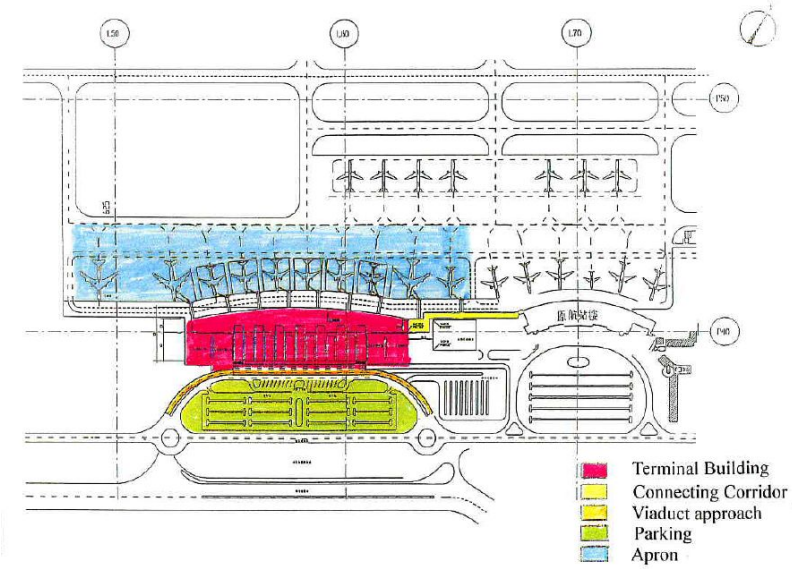


Figure 1 Project Plan

Approved Amount/Disbursed Amount	3,091 million yen / 3,091 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	October 2000 / October 2000
Terms and Conditions	Interest 0.95%; Repayment period 40 years with grace period of 10 years Tied under the Special Yen Loan[1]
Borrower/Executing Agency	People's Republic of China/General Administration of Civil Aviation of China (Xian Xianyang International Airport)
Final Disbursement Date	February 2009
Main Contractor (over 1 billion yen)	-
Main Consultant (over 100 million yen)	-
Feasibility Studies, etc.	Feasibility Study for Xian Xianyang International Expansion Project (China Civil Aviation Airport Construction Company/China Civil Aviation Airport Planning, Design and Research Institute, June 1999; EIA (China Environmental Science Research Institute, November 1999)
Relevant Projects	None

2. Outline of the Evaluation Study

2.1 External Evaluator

Yasuhiro Kawabata, Sanshu Engineering Consultant

2.2 Duration of Evaluation Study

The subject ex-post evaluation assignment was implemented as follows:

Duration of the Study : October 2010 to October 2011

Duration of the Field Study : January 9-21, 2010 and April 3-15, 2011

[1] This project was implemented utilizing the Special Yen Loan (SYL). SYL was introduced by the government of Japan in 1998 as one of the financial relief measures for Asian countries suffered from the Asian economic crisis. SYL was to provide concessionary financial assistance for the development of infrastructures in the fields of transportation logistics, foundation for productive facilities and large-scale disaster prevention. The terms and conditions of SYL is set at greater concessionary level than standard terms and conditions of ODA loans, while the eligibility of the prime contractors under SYL is limited to Japanese nationals or judicial persons and procurement of goods and services under SYL is tied to Japanese goods and services (goods and services whose country of origin being other than Japan can be procured up to no more than 50% of the total loan amount).

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

3.1 Relevance (Rating: ③[3])

3.1.1 Relevance with the Development Plan

Under the 9th Five-Year Plan for the China Civil Aviation Development (1996-2000), it was projected that by 2000 the total nation-wide air cargo would reach 11.6 billion ton-km, and that the annual transporting volume would reach 64 million passengers and 1.95 million tons of air cargo together with 1,122 air routes by regular airline flights. In order to respond to the transporting demand by air, the government decided to address the following: 1) increase the number of aircrafts from 416 units in 1995 to 660 units; 2) new construction or rehabilitation of 41 major airports, including those in government directly-controlled cities, autonomous/provincial capital cities, and other major cities; 3) development of air navigation control system; and 4) establishment of a training center to train professionals to be involved in the air business, including becoming pilots and air navigation controllers. The 10th Five-Year Plan has determined that the western region has the most priority, and that during the five-year plan, 20 airports would be constructed (including rehabilitation and expansion). It was expected that by 2005, the number of passengers and cargo volume would reach 94 million and 3.6 million tons, respectively.

Chapter 16 “Development of Producer’s Service Industry” of the 11th Five-Year Plan states that the large airport would be further expanded, airport density in the western central/northeastern regions would be enhanced, and more modern air navigation control systems would be established. Furthermore, Chapter 15 of “the Recommendations to the Establishment of 12th Five-Year Plan (2011-2015): National Economy and Social Development” by the National Central Party Committee has decided that the development of port and airport facilities would continue and that the reform of air navigational zone control system would be implemented.

Chapter 6 of “the Manual for the 11th Five-Year Plan: National Economy and Social Development” by the Shaanxi Provincial Party Committee emphasizes that regarding airport development, “one main and four sub” air navigational network - Xian Xianyang Airport as being the main and those in four rural cities as the sub-airports - would be established.

3.1.2 Relevance with the Development Needs

Since Xian Xianyang Airport was open to public in 1991, the number of passengers and cargo volume by air has been increasing and the actual number of passengers and cargo volume has exceeded the projected figures. Under the current and rapidly increasing demand, the Shaanxi

[2] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[3] ③:High, ②:Fair, ①:Low

Provincial government has determined that expansion of the airport facilities was a high priority.

The current “Chapter 3 of the Recommendations to the Establishment of 12th Five-Year Plan” by the Shaanxi Provincial Party Committee emphasizes that the infrastructure development is still an important agenda. Particularly, with regards to the development of airports, it emphasizes the following: strengthening the hub function of Xian Xianyang International Airport; further development of the air navigational network; and promotion of the air service business.

3.1.3 Relevance with Japan’s ODA Policy

In the Annual Report on the Implementation of Japan’s ODA (1999), the aid policy towards China was to resolve the lagging infrastructure development, including transport, communications and power sectors, which was an obstacle in China’s economic development, thus making it one of the priority sectors. Particularly in the transport sector, it was proposed to provide aid to projects that would increase transporting capacity by constructing transportation facilities and enhancing the maintenance and management technology that would raise transportation efficiency.

According to the Overseas Economic Cooperation Implementation Policy (issued on December 1, 1999 and valid up to March 2002), the Japanese aid policy towards China focused on alleviation of disparity between regions, particularly giving priority to inland regions and to the development of the economic and social infrastructure that would promote self-motivating economic development to promote the development of the private sector and democratic markets, and to urge a well-balanced development to promote a market-oriented economy.

Accordingly, the project has been highly relevant with the Chinese development plan and needs, as well as Japan’s ODA policies. Its relevance is therefore considered high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

The original and actual output is shown in Table 1.

Table 1　Output (Original and Actual)

Item	Original	Actual
1) Civil work	・ Passenger Terminal: about 52,000 m^2 ・ Apron: about 200,000 m^2 with 13 spots (boarding bridge) ・ Access Road: about 3km ・ Utilities (power, water supply and sewage, drainage, air conditioning and natural gas)	: about 79,000 m^2 (about 50% increase) : about 240,000 m^2 (about 20% increase), 20 spots (8 units are under the Yen Loan and 5 units by own funds) : about 6km (100% increase) : almost as planned
2) Procurement of equipment	・ Equipment and materials needed for the above civil work	: almost as planned

Source: Appraisal documents and responses to the Questionnaire

The main reason that the planned passenger terminal area has increased by 50% was because the structure of the terminal building was changed from a three-story building to a three-story building above ground and a basement with a parking lot, offices, maintenance facilities, service resting facilities and other facilities with more spaces based on the results of the review conducted on demand projection. A larger apron area (20% larger than planned) was constructed to respond to the future traffic demand. The access roads were expanded, double its original length, to allow it to be connected with the newly constructed expressway.

Under the original plan, eight boarding bridges were to be constructed together with the new construction of the terminal building, and five were to be constructed replacing the existing bridges after the rehabilitation of the old terminal. However, since it was considered that the supply and installation of five bridges would not be completed by the original loan closing date (January 31, 2006), it was decided that this would be locally funded.

Before this project was completed, construction of the second runway, with a length of 3.8 km, and a third passenger terminal, with an area of 50,000 m^2, of the Xian Xianyang International Airport had commenced and work is expected to be completed by mid 2012. Consequently, the handling capacity of the airport will be enhanced substantially.

Inside of Air Port Terminal

Boarding bridge

3.2.2 Project Inputs

3.2.2.1 Project Cost

The actual total project cost was 18.555 billion yen, of which the Japanese ODA loan amount was 3.091 billion yen and the rest was funded by the Shaanxi Province and Xian International Airport Company. It was equivalent to 113% of the planned project cost (16.436 billion yen) and 104% in Chinese yuan (1.326 billion). However, as discussed above in para. 3.2.1, Project Outputs, the planned passenger terminal floor area has increased by about 50%, the apron area by about 20%, and the total length of access roads by about 100%, and as a consequence, the project scope has been expanded as well. The estimated actual project cost of the original project scope was about 15 billion yen, which was within the plan.

The total project cost in Chinese yuan was almost within the planned cost although there were some design changes and variations, including those for the passenger terminal, apron and access roads. One of reasons is attributed to lower bidding price offered by bidders made possible by introducing competitive bidding procedures, including the International Competitive Bidding (ICB). However, the project cost was increased by about 13% in Japanese yen due to depreciation of Chinese yuan (devalued by about 8%) and other reasons.

Table 2 Comparison of Project Cost (Planned and Actual)

Item	Planned					Actual				
	Foreign currency	Local currency		Total		Foreign currency	Local currency		Total	
	Million yen	Million yuan	Million yen	Million yuan	Million yen	Million yen	Million yuan	Million yen	Million yuan	Million yen
Land acquisition		45.95	570	45.95	570		42.93	577	42.93	577
Passenger Terminal	2,829	336.45	4,172	564.60	7,001	3,091	457.52	6,145	687.68	9,236
Apron	82	81.97	1,017	88.63	1,099		76.19	1,023	76.19	1,023
Access road		19.83	246	19.83	246		74.64	1,002	74.64	1,002
Other utilities		332.67	4,125	332.67	4,125		421.36	5,659	421.36	5,659
Other facilities		126.48	1,568	126.48	1,568					
Tax/ Administration		73.63	913	73.63	913		78.78	1,058	78.78	1,058
Price escalation	33	18.38	228	21.05	261					
Contingency	147	40.84	506	52.66	653					
Total	3,091	1,076.20	13,345	1,325.50	16,436	3,091	1,151.42	15,464	1,381.58	18,555

Source: Appraisal documents and responses to the Questionnaire

Exchange rates: 1 yuan=12.4 yen at appraisal and 1 yuan=13.43 yen at post evaluation (average of exchange rates during the implementation period 2000-2003

Although the actual project cost was much higher than the plan, it was still considered appropriate because of the changes in the project scope.

As explained above, this project was implemented utilizing the Special Yen Loan (SYL) and the customer satisfaction survey was conducted during the ex-post evaluation. According to the

executing agency, the bid price was not higher than a bid price seen in other similar type of projects in China and the quality of the contractors was at a satisfactory level.

3.2.2.2 Project Period

The project period planned at appraisal was from October 2000 (signing of the Loan Agreement) to June 2002 (project completion), with a total period of 21 months. However, the Executing Agency prepared the implementation plan in which part of the work scheduled for July 1999. The project period according to this implementation schedule was 36 months from the commencement of bidding (July 1999) through the proposed project completion date (June 2002).

The actual project period was from October 2000 (signing of the Loan Agreement) to September 2003 (opening of a passenger terminal) with a total period of 36 months, or equivalent to 171% of the planned period. The reasons for the 17-month delay in passenger terminal opening to the public from the originally planned completion date (June 2002) were: 1) design changes, including installation of parking and office spaces in the terminal basement; and 2) outbreak of severe acute respiratory syndrome (SARS) during end 2002 - early 2003, prohibiting the movement of people and cargo.

Part of the Yen loan was used for replacement/upgrading of equipment in the old terminal building (materials for water supply and sewage systems, air conditioners, electrical circuit, escalators, elevators and electric sign board). As a result, the loan closing date became February 2009.

Security Check Facilities

Check-in Baggage Sorting Table

The bidding procedure proposed at appraisal was International Competitive Bidding (ICB – Japanese tied) for the foreign currency funded portion, with 11 packages for structures, interior, lighting, power supply, transporting equipment, security check, boarding bridges, elevators/escalators, intelligent system, terminal lighting system, and air conditioning system. The local currency funded portion included mostly civil and installation work, to be procured

through National Competitive Bidding (NCB).

The actual bidding procedure used for the foreign currency funded portion was ICB (Japanese tied) as planned. The actual number of procurement packages was 15. The items procured were almost the same as those planned at appraisal. The local currency funded portion included mostly civil and installation work, and these work was procured through National Competitive Bidding (NCB). The number of procurement packages was about 50.

The majority of the goods (equipment and materials) were procured through 15 ICB packages. However, since the procurement method/packages included: 1) procurement of goods; 2) supply and installation procurement method; and 3) procurement of goods and work through NCB procedures, the procurement implementation operation became so complex, and the details of daily coordination among suppliers and contractors regarding the timing of delivery of equipment and material, and the civil work implementation plan was required. The project management became extremely difficult.

The actual project period largely exceeded the plan because of impacts of "SARS" and other reasons.

According to the customer satisfaction survey, the executing agency stated that there were some cases that needed a longer procurement period because of rebidding due to less qualified bidders, but that they were satisfied with the contractors' effort to keep the contract term so that the work was completed on time for the planned date for opening of the air terminal.

Although the project cost was within the plan, the project period was much longer than planned; therefore the efficiency is considered fair.

3.3 Effectiveness[4] (Rating: ③)

3.3.1 Quantitative Impacts

3.3.1.1 Results from Operation and Effect Indicators

(1) Number of Passengers at Xian Xianyang Airport

The number of passengers using the Xian Xianyang Airport is shown in Table 3.

[4] The rating of the project's effectiveness takes into account the evaluation of the project's impact.

Table 3 Number of Passengers at Xian Xianyang Airport

Unit: 0,000 persons

	1998 Base year	2003	2005 2 years after completion	2006	2007	2008	2009	2010
Projected		408	466	523	580	637	694	750
Actual	286	440	794	937	1,137	1,192	1,529	1,801
Domestic	268	424	752	890	1,085	1,164	1,503	1,766
International	18	16	42	47	52	28	26	35

Source: Appraisal documents and responses to the Questionnaire

Note 1: Domestic includes direct flights between Xian, and Hong Kong and Taiwan.

Note 2: International includes direct flights between Xian, and Tokyo, Nagoya, Bangkok, Kuala Lumpur, Singapore, and Seoul.

Note 3: The new terminal was open to public on September 18, 2003.

At the planning stage, the number of passengers at Xian Xianyang Airport was projected to increase by 1.7 times during the period of 2003-2009. However, it increased by 3.48 times, which was much higher than the average growth rate (2.6 times) of China. It was obvious how rapidly the number of passengers at Xian Xianyang Airport has increased. The actual number of passengers is about 2.4 times higher compared to the projected for 2010 at the planning stage.

The total area of the passenger terminal added the newly constructed terminal area (79,000 m^2) to the old terminal area is about 100,000 m^2. Compared with the Fukuoka Airport, which has a terminal with the area of 178,000 m^2, and a 2,800 m runway with 140,000 takeoffs and landings a year (in 2009), the total terminal area is considered to be insufficient. Since the actual number of passengers (about 6.2 million) using the Xian Xianyang Airport has substantially exceeded the projected number of passengers in 2004, the Xian Xianyang Airport Company prepared an airport rehabilitation plan, which included construction of an additional terminal building and a second runway. The Airport Company commenced the rehabilitation work, including construction of the third terminal building and the second runway in December 2008; and work is expected to be completed by end 2012.

(2) Cargo Handling Volume at Xian Xianyang Air Port

The cargo handling volume at Xian Xianyang Air Port is shown in Table 4.

Table 4　Cargo Handling Volume at Xian Xianyang Air Port

unit: 0,000 tons

	1998 Base Year	2003	2005 2 years after completion	2006	2007	2008	2009	2010
Projected		8.1	9.2	10.0	10.7	11.5	12.2	13.0
Actual	5.8	6.3	8.3	9.9	11.2	11.7	12.7	15.8
Domestic	5.3	5.8	7.8	9.1	10.3	11.1	12.3	15.4
International	0.5	0.5	0.5	0.8	0.9	0.6	0.4	0.4

Source: Appraisal documents and response to the Questionnaire
Note: Domestic includes those of direct flights between Xian and Hong Kong and Taiwan.

The cargo handling volume (aerial post) at Xian Xianyang Air Port has been increasing since 2006 almost as projected. However, the actual handling volume in 2010 was about 20% greater than projected.

(3) Number of Takeoffs and Landings

The number of takeoffs and landings at Xian Xianyang Air Port is shown in Table 5.

Table 5　Number of Takeoffs and Landings at Xian Xianyang Air Port

unit: 0,000 times

	1998 Base Year	2003	2005 2 years after completion	2006	2007	2008	2009	2010
Projected		8.1	9.2	10.0	10.7	11.5	12.2	13.0
Actual	3.6	5.7	8.2	9.8	11.5	11.5	14.4	16.1
Domestic	3.4	5.5	7.8	9.3	11.1	11.3	14.2	15.8
International	0.2	0.2	0.4	0.4	0.4	0.2	0.2	0.3

Source: Appraisal documents and response to the Questionnaire
Note: Domestic includes those of direct flights between Xian and Hong Kong and Taiwan.

The number of takeoffs and landings at Xian Xianyang Airport has been increasing since 2009, exceeding the projected number. The actual number of takeoffs and landings in 2010 was 161,000 (the number of takeoffs and landings at Fukuoka Airport in Japan, which seems to reach its handling capacity was 130,000 a year).

Upon completion of the project, the new terminal, as well as the old terminal, can handle the increasing demand of passengers and cargo; therefore its effectiveness has appeared.

3.3.1.2　Results of Calculations on Internal Rates of Return (IRR)

Financial Internal Rate of Return (FIRR)

FIRR at appraisal and at post evaluation are shown on Table 6

Table 6 FIRR (at appraisal and at post evaluation)

	At appraisal	At post evaluation
FIRR	11.0	13.7

Note: Benefits includes Takeoff/Landing fee, Ground service fee, Terminal fee and others Costs include Construction costs, Operation and Maintenance and Taxes.
Project life: 20 years

The FIRR at appraisal was copied from the appraisal document. It is difficult to calculate the FIRR at post evaluation based on the same assumptions made at appraisal because of several design changes (i.e., construction of the second runway at project completion, commencement of the third passenger terminal, and reconstruction/conversion of the ground parking lots to a parking garage/building). The FIRR stated in the feasibility study report (2008) showed references to the construction plan for the second runway and the third terminal.

Terminal Departure Entrance

Check-in Counter

3.3.2 Qualitative Effects

Xian Xianyang International Airport has been responding to the air traffic demand (passenger and cargo), to and from Xian, and serving as a hub airport in China's northwestern region. Regarding domestic flights, all four major airlines call at Xian to connect with major cities, including Beijing, Shanghai, Guangzhou, Chongqing and about 40 local cites (including Ankang, Yanan and Yulin in Shaanxi Province). Compared with the number of flights call at Chongqing, which has about the same urban population (about 4 million), the number of flights call at Xian is higher. With respect to international flights, four foreign airlines, including Japan Air Lines, call at Xian and connect with Tokyo, Pusan, Seoul, and Bangkok. Four other domestic airlines connect with Hong Kong, Taipei and Osaka.

Before the project was completed, check-in counters were prepared for each departing flight. Under the project, advanced computerization of the operational system had made it possible to check in at any counter. Thus, the time for check-in procedures has been substantially reduced,

and efficiently operated.

The Xian Xianyang Airport ranks 8th overall in the number of passengers among the airports in China.

Accordingly, the project has largely achieved its development objective, and its effectiveness is considered high.

3.4 Impact

3.4.1 Intended Impacts

At the appraisal stage, it was expected that upon completion of the project, the airport operation company, which would be responsible for operation and maintenance of the airport would employ about 180 staff and entrust the daily operation and maintenance work to the subsidiary or relevant companies (about 1,200 employees). The current total number of employees of the airport operation company is about 1,600. The subsidiary company responsible for cleaning works has about 700 employees, and the management of parking lots has about 200 employees. Thus, the project contributes to the regional economic development through increasing the employment opportunities.

In addition, the Shaanxi's development plan for Xianyang Airport Industrial Park intends to invite industries, including airport related businesses, such as air cargo handling, repair and maintenance of large aircrafts, and air in-flight services/ transport neighboring the airport. This park is expected to be completed by 2020.

The average GDP growth rate during 2004-2009, upon completion of the airport terminal, was about 14%, which indicated high economic growth. The total income from the tourism in Shaanxi accounts for about 9% of Shaanxi's GDP, which indicates that tourism, is one of its important sources of revenue.

3.4.2 Other Impacts

(1) Impacts on the Natural Environment

The noise level around the airport has been regularly monitored. Since the houses that were feared to be affected by the noise during the construction stage, were acquired and resettled, hence there were no noise problems reported. Since the sewage treatment plant with a capacity of 10,000 tons/day was constructed under the project, no problem on discharged water and sewage has been also reported. Xian Xianyang International Airport received the National Greenization Model Project Honor Award in March 2004 and the airport company was recognized as the Provincial Green Enterprise in June 2004.

(2) Land Acquisition and Resettlement

The original plans for land acquisition area and number of resettled people were 45 ha and about 650, respectively. However, the actual land area acquired was 47.6 ha. The reasons for increased land area were: 1) the houses, feared to be affected by the noise, were additionally acquired and resettled; 2) remaining agricultural land, use of the land was considered ineffective, was acquired at the request of the land owners; and 3) designs for roads and drainage facilities were changed, taking into consideration the possibility of future airport expansion. The actual number of resettled people was about 650 as planned, but the actual costs spent for the land acquisition and resettlement was 42.93 million yuan, which is less than the originally planned (the estimated cost at the feasibility stage). According to the executing agency, since the notice to and consultation with the residents were fully undertaken before the project implementation, no complaint has been reported after the project completion.

(3) Unintended Positive and Negative Impacts

No negative impact has been observed.

The project has increased the employment opportunities within or outside the airport and thus, it has contributed to the regional economic development. The project has led the growth of the regional economy and industry through the Xianyang Airport Industrial Park Plan.

3.5 Sustainability (Rating: ③)

3.5.1 Structural Aspects of Operation and Maintenance

After the passenger terminal was completed in 2003, the organizational set up to operate the airport has changed a few times. On August 1, 2008, four group companies merged and the present China West Airport Group (CWAG), which has main assets such as the airport terminal and the energy supply facilities, was established. Currently, Xian Xianynag International Airport Company (XXIAC), which is a subsidiary company of CWAG, is in charge of operation and maintenance of the airport. Under the Board of Directors and Board of Audits, XXIAG consists of a General Manager, 7 Deputy General Managers, and 15 departments and offices with a total number of about 1,600 employees. All the staff assigned to the Equipment and Electric Facilities Maintenance/Management Department (about 90 staff) and some of the staff assigned to Terminal Operations Department (about 30 staff) is responsible for maintenance work for the airport. Staff of Security Inspection Department (660 staff) is responsible for the security check operations, and the clearing work in the terminal building and the management of parking lots are entrusted to subsidiary companies.

3.5.2 Technical Aspects of Operation and Maintenance

There is about 122 staff, who is in charge of maintenance work. By category of the educational background, 42 are Master's or Bachelors' degree holders, 63 Associate degree (vocational school) holders, and 17 non-degree holders. There is 25 staff, who has technical qualifications (one professional engineer, 12 middle-class engineers, and 12 junior engineers). The Airport Company has undertaken the training program every year taking into account the technical skills required to each post and needs required for the career development for each staff. At the end of year, results of the training achievement and the implementation status of the training program have been assessed. The 2010 training program provided to the staff in charge of maintenance work, including the staff of the Equipment and Electric Facilities Maintenance/Management Department consisted of 15 modules and the training was provided outside the company. The timing of the training, number of trainees, training duration, and the targeted objective were clearly defined in the training program.

With respect to the airport operation and maintenance work, the laws/ regulations/code on fixed asset investment management, facilities/equipment/vehicle management, construction supervision, tentative business operation/management and others have been stipulated and these have been implemented.

3.5.3 Financial Aspects of Operation and Maintenance

The financial status of the Xian Xianyang International Airport Company (XXIAC), which is in charge of operation and maintenance of the airport for the past three years, is shown in Table 7.

Table 7 Financial Status of Xian Xianyang International Air Port Company

unit: 000 yuan

	Item	2008	2009	2010
1	Main Business income	407,082	555,680	646,053
2	Operation costs	285,492	324,614	344,717
3	Maintenance costs	62,298	81,153	86,179
4	Taxes	14,067	19,603	26,280
5	Profits from main business	45,225	130,310	188,877
6	Profits from other business	52	0	0
7	Financing costs	47,454	-22,920	3,160
8	Business profit	-2,176	153,230	185,717
9	Non-business income	0	0	210
10	Non-business expenditures	5,000	0	16,290
11	Net profit	-7,176	153,230	169,636

Source: Executing agency

Since the financial costs due to borrowing accrued in 2008, there was a shortfall in net profit. However, since the number of passengers has increased for the past two years (2009 and 2010), the company has had a surplus. The gross capital of the company has increased every year, and

thus the company's financial status has been stable.

3.5.4 Current Status of Operation and Maintenance

The daily routine maintenance work has been undertaken by XXIAG. When the more technically difficult repair/maintenance cannot be handled by the company, the work is entrusted to the special maintenance company and has been regularly undertaken. Major repair and rehabilitation work has been entrusted to the contractor, which was selected through the competitive bidding.

The airport currently has two terminal buildings, 15 boarding bridges, 21 security check booths, 71 check-in counters, and 13 cargo sorting turntables. From the field inspection it seems that the facilities and equipment are in a good condition. Boarding bridges and cargo sorting tables have already been overhauled.

Therefore, since no major problems have been observed in the operation and maintenance system (organizational setup, technical capacity and financial status), sustainability of the project is considered high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The project objective was to contribute to the enhancement of economic/commercial activities and trade in China's northwestern region through meeting the increasing traffic demand at the existing Xian Xianyang International Airport by constructing the new passenger terminal building and relevant facilities.

The project has been highly relevant with the Chinese and provincial development plans and needs, as well as Japan's ODA policies, and therefore its relevance is high. Although the project cost was within the plan, the project period was much longer. Therefore, the efficiency is considered fair. Regarding its effectiveness, the project has largely achieved its development objectives (respond to the increasing passenger/cargo demand and contribution to the regional economy), and thus, its effectiveness is considered high. Since no major problems have been observed in the operation and maintenance system, sustainability of the project is considered high.

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

4.2 Recommendations

4.2.1 Recommendation to the Executing Agency

none.

4.2.2 Recommendation to JICA

none.

4.3 Lessons Learned

Regarding the procurement of goods, majority of goods (equipment and materials) were procured through the ICB procedures. However, the procurement method/packages included: 1) procurement of goods only; 2) supply and installation procurement method; and 3) procurement of goods and work through NCB procedures. Thus, the procurement implementation operation became so complex, and the details of daily coordination among suppliers and contractors regarding the timing of delivery of equipment and material, and the civil work implementation plan were needed.

Since the project requires procurement of a number of goods, an implementation plan for civil works and a detailed procurement implementation plan (planning of detailed procurement process and procedures for work and goods, appropriateness of procurement packages, review of technical specifications and others) should be prepared in order to have a well-organized comprehensive project implementation plan.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
① Project Output	**Civil Work** ・ Passenger Terminal: about 52,000 m^2 ・ Apron: about 200,000 m^2 with 13 spots (boarding bridge) ・ Access Road: about 3km ・ Utilities (power, water supply and sewage, drainage, air conditioning and natural gas) **Procurement of Equipment** ・ Equipment and materials needed for the above civil work	 : about 79,000 m^2 (about 50% increase) : about 240,000 m^2 (about 20% increase), 20 spots (8 units are under the Yen Loan and 5 units by own funds) : about 6km (100% increase) : almost as planned : almost as planned
② Project Period	October 2000 (L/A)~ June 2002 (Project completion) (21 months)	October 2000 (L/A)~ September 2003 (Opening of terminal) (36 months)
③ Project cost Foreign currency Local currency Total Yen Loan Portion Exchange rate	 3,091 million yen 13,345 million yen (1,076 million yen) 16,436 million yen 3,091 million yen 1 yuan＝12.4 yen (as of January 2000)	 3,091 million yen 15,464 million yen (1,151 million yen) 18,555 million yen 3,091 million yen 1 yuan ＝13.43 yen (Average of September 2000~ September 2003)