People's Republic of China

Hainan Development Project (Highway) (I) (II)

Hainan East Expressway Expansion Project

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1. Project Outline and Japan's ODA Loan

Map of Project Area

Hainan East Expressway

1.1 Background

As one of the administrative districts of Guangdong Province, Hainan island served as an important base from which other provinces got their primary commodities such as agricultural, marine and mineral products. As a result, its secondary industry did not develop very much, and the pace of its economic growth was extremely slow, as evidenced by the fact that, at 999 yuan, its per capital GNP of 1988 was lower than the national average of 1,081 yuan. Against this background, in April 1988, on the occasion of being promoted to a province as well as being designated as China's fifth special economic zone, the newly-promoted Hainan Province was launched as an experimental area amid high expectations of developing in its unique way by capitalizing on its wealth of natural resources. The Hainan Development Strategy, which was prepared by the Chinese Academy of Social Sciences, set as its goal for the 20-year period from 1988 to 2007 an annual growth rate of 13.5% and made the development of energy, transportation and telecommunication sectors an important priority issue. This was the same period when the 7th Five-Year National Development Plan (1986–1990) was implemented, and therefore the development of basic transportation infrastructure was also adopted as a priority issue domestically, with a particular urgency being attached to road development for fundamental transportation.

1.2 Objective

This project aims to respond to the issue of increasing traffic and traffic safety by constructing and expanding a 253-km highway linking Haikou, the principal city in eastern Hainan island, and Sanya, the main city in southern Hainan island; thereby contributing to the economic growth of Hainan.

1.3 Borrower/Executing Agencies

Government of the People's Republic of China / Government of Hainan Province (March 1991–March 1993), Hainan Expressway Co., Ltd. (since April 1993)

1.4 Outline of Loan Agreement

Loan Amount / Disbursed Amount	Total: 18,229 million yen / 16,981 million yen Phase 1: 7,100 million yen / 7,064 million yen Phase 2: 5,855 million yen / 5,814 million yen Expansion: 5,274 million yen / 4,103 million yen
Exchange of Notes / Loan Agreement	Phase 1: December 1990 / January 1991 Phase 2: September 1991 / October 1991 Expansion: March 2000 / March 2000
Terms and Conditions Main Contract – Interest – Repayment Period – Grace Period – Procurement Consulting Services – Interest – Repayment Period – Grace Period – Procurement – Main Contract – Interest – Repayment Period – Grace Period – Procurement Main Contract – Interest – Repayment Period – Grace Period – Procurement	 Phase 1 2.5% 30 year 10 years General untied 0.75% 40 year 10 years General untied Phase 2 2.6% 30 years 10 years General untied 2.6% 30 years 10 years General untied
Final Disbursement Date	Phase 1: February 1996 Phase 2: November 1997 Expansion: July 2005

Main Contractors (Only those of 1 billion yen or more)	None
Consulting Services (Only those of 100 million yen or more)	None
Feasibility (F/S), etc.	Transportation Department, Second Institute of Survey and Design for Highway Engineering (1998)

2. Results and Evaluation (Rating: A)

2.1 Relevance (Rating: a)

2.1.1 Project Relevance at the Time of Appraisal

This project was planned as a 253-km long east expressway linking Haikou and Sanya on the basis of the "Hainan Economic Development Strategy" (1988–2000), which was adopted in 1988 on the occasion of the Hainan District of Guangdong Province being promoted to a province.

In the 7th Five-Year National Development Plan (1986–1990), the development of basic transportation infrastructure was made an important issue. This is why this project was given high priority. Additionally, since the basic developmental needs areas in Hainan Province are agriculture, tourism and industry, the eastern part of Hainan Province is an important area for each of these sectors. That being the case, it can be said that the highway that was built under this project became an important part of Hainan's infrastructure. After the start of implementation, construction work for expansion of road width was carried out along with several changes of the original plan in response to the increase in traffic volume and traffic accidents that began to increase in tandem with Hainan's economic growth. It is judged that these changes of plan were consistent with the national development plan and with each of the development goals of the time, as well as with the transportation conditions of Hainan.

2.1.2 Project Relevance at the Time of Evaluation

This project functions in step with the current development of Hainan's economy while maintaining policy consistency with the 11th Five-Year National Development Plan, which advocates the formation of a mechanism for regional market expansion and harmonization between agriculture and industry and between rural and urban communities. For these reasons, the project is evaluated highly. Meanwhile, in terms of policy enforcement, since areas with developed industries are concentrated in the vicinity of Haikou City (light industry) and the western part of Hainan island (heavy chemical industry), there is a stronger need for transportation infrastructure, that is, roads and the West Expressway around Haikou.

As a result, the East Expressway is not always used for industrial ends. However, the expressway is serving as infrastructure for developing Hainan's tourist industry and agriculture in its eastern hinterland as well as for distributing goods throughout Hainan island. Moreover, despite the adoption of agricultural development as a priority policy, agriculture continues to slowly decline. As a result, although the Hainan government still aims to promote the development of industrial areas that give traction to agriculture (food industry, processing of farm products, etc.), at this point in time, there are no clear signs that this policy is having any impact. Consequently, to give an element of consistency to the current developmental needs of Hainan's economy and the construction of the East Expressway, priority is given to the development of tourism, while the project's contribution to industrial development is recognized to a certain extent. Furthermore, if the future development of agricultural processing industry and the potential for developing tourism in the east coast areas are considered, the importance of this project will be highly evaluated on the policy enforcement front.

Moreover, the road expansion project was responding adequately to the growing traffic volume and increasing number of traffic accidents, and so the relevance of the timing for implementing changes in the original plan and the scale of road expansion is favorably evaluated.

Implementation of this project was consistent with the national development plan and the like both at the time of appraisal and at the time of evaluation. Thus, the implementation of this project is considered highly relevant.

2.2 Efficiency (Rating: b)

2.2.1 Output

Phases 1 and 2

Item	Planned	Actual
Road (Highway: Fucheng – Tiandu)	253 km long, 10.5 m wide, 2-lane	As planned
(Access roads : Haikou/Sanya)	16 km long,10.5 m wide, 2-lane section	As planned
(Width (4-lane) Fucheng–Qionghai)	—	84 km long, 24.5 m wide, 2-lane
Bridges	Long/large: 12, Mid-size: 14, Small: 58	Long/large:13, Mid-size: 20, Small: 69
Tunnels	2 sites (290 m, 1091 m)	As planned
Exits	13 sites	As planned
Tollgates	5 sites	Installed at 1 site, later removed[1]

[1] All highways in Hainan Province became free pursuant to an act of the provincial government that came into force in January 1994. As a result, the tollgate that was installed at one site in 1993 (33 km from Haikou) was removed after about one year of operation.

Service areas	2 sites	9 sites[2]
Parking areas	1 site	As planned

Expansion Project

Item	Planned	Actual
Roads (Highways: Lingshui – Tiandu)	60 km long, 24.5 m wide, change to 4-lane	As planned
Bridges	10 sites	As planned
Tunnels	1 site	As planned
Exits	1 site	As planned
Service areas	2 sites	As planned
Vehicle maintenance facilities	1 complete set	Cancelled[3]

This project aimed to construct a 253-km highway between Fucheng (Haikou) and Tiandu (Sanya) in Hainan Province. But it soon became clear that the 2-lane highway that was built in accordance with the original plan would not meet the growing traffic demand, and because there were many traffic accidents, it was decided that the initial plan for a 2-lane highway should be changed to a 4-lane highway project. On the other hand, various changes were made in the original plan due to a host of factors including the problem of financing, the problem of privatization of the executing agencies, as well as the elimination of toll collection, and at the same time, the road expansion project was implemented in incremental steps. Ultimately, a 4-lane highway stretching over a distance of 253 km was constructed. Construction work for road expansion along the 107-km stretch of highway between Qionghai and Lingshui was financed with funds on hand, and did not use ODA loans.

2.2.2 Project Period

2.2.2.1 Project Period at the Time of Planning and Actual Period

With regard to the construction schedule of this project, which was implemented in stages, construction work was undertaken separately in parallel. There were delays within the construction process for various reasons,[4] but an evaluation of the overall schedule shows there were no delays during the 1st and 2nd phases of construction. Furthermore, all of the delays, which lasted a total of five months, came during the road widening construction work.

[2] New service areas are being installed at the request of users, gasoline distributors and so on. As of March 2008, new service areas were being installed at sites located asymmetrically along the highway going north and south.

[3] Due to cuts in the budget, maintenance vehicles currently available were used, and the purchase of new vehicles was stopped.

[4] Reasons for the delays include: (i) changes in design due to topography and land features; (ii) privatization of the executing agencies; (iii) fund shortage and fund procurement in the bond market; (iv) eliminating highway tolls; (v) changes in the method of treating road surfaces; (vi) construction of Damao Tunnel compatible with their geological condition; (vi) unseasonably long rain, typhoons, etc.; and (vii) temporary difficulty in obtaining construction materiel.

Consequently, while the total duration of all the periods that were planned at the time of appraisal was 9 years and 7 months (115 months), the actual duration was 10 years (120 months), and thus the actual total duration was 104.3% of the planned total duration.

Project	Section	Planned		Actual[5]	
1•2	Right lane: Fucheng – Tiandu	Jan. 1991 – Jun. 1994	42 mon.	Jan. 1991 – Dec.1995	60 mon.
	Left lane: Fucheng – Qionghai	Apr. 1995 – Mar. 1998	36 mon.	Apr. 1995 – Mar.1998	36 mon.
	Phases 1–2	Jan. 1991 – Mar. 1998	87 mon.	Jan.1991 – Mar.1998	87 mon.
Expansion	Left lane: Lingshui– Tiandu	Jan. 1999 – Apr. 2001	28 mon.	Jan. 1999 – Sep. 2001	33 mon.
Total			115 mon.	120 mon. (104.3% of the plan)	

2.2.3 Project Cost

2.2.3.1 Project Cost at the Time of Planning and Actual Cost

(1) Planned Budget

The project cost is indicated below. Since the actual project cost was calculated by using the exchange rate at the time of planning (1990), it does not reflect the actual condition. Thus, here, the actual expenditure of the project cost was revised and adjusted by using the average exchange rate for the year in question. As a result, the various project costs that were planned at the time of appraisal totaled 60,229 million yen (Japanese ODA loan amount: 18,229 million yen), but the actual cost was 72,753 million yen (Japanese ODA amount: 16,982 million yen), that is, 120.79% of the planned cost.

Project		Planned (million yen)	Exchange Rate (yen/yuan)	Actual (million yen)	Exchange Rate (yen/yuan)	Actual (adjusted) (million yen)	Exchange Rate (yen/yuan)
Phases 1 – 2	1・2 L/A time	31,887	26.20	—	—	—	—
	L/A Amount changed	15,358	13.46	—	—	—	—
	Total	47,245	20.04	115,769	34.40	62,080	16.75
	Japanese ODA Loan	12,955	—	12,879	—	—	—
Expansion	Total	12,984	15.00	11,583	15.00	10,673	14.02

[5] The construction schedule based on the planned and actual values described in the Project Completion Report (PCR)

	Japanese ODA Loan	5,274	—	4,338[6]	—	—	—
Total	Total	60,229		127,352		72,753	—
	Japanese ODA Loan	18,229	—	17,217	—	16,982	—
	Local Currency Portion	42,000	—	110,135	—	55,771	—

During the project period, the project was implemented virtually as planned. However, since the project cost was about 22.4% more than what was planned, the efficiency evaluation of the project is judged to be about average.

2.3 Effectiveness (Rating: a)

2.3.1 Annual Average Daily Traffic

Although traffic per day between Haikou city and Qionghai city in 2005 was greater than what was planned, the traffic between Qionghai city and Sanya was less than the average daily traffic between Wanning and Sanya. Thus, traffic between Haikou and Qionghai grew at an impressive rate. This, presumably, is related to a number of factors, including the fact that industrial production is concentrated in the northeastern part of Hainan island and the tourist industry has more or less peaked.

Additionally, the rate of increase in traffic began to slow down after 2001, which may have been a reflection of the sluggishness of the tourist industry and the gradual slowdown in the growth of agriculture. Moreover, it is believed that, as a result of the opening and expansion of the Sanya International Airport, there is now a tendency for many foreign travelers to enter China directly through the new airport; thus reducing the number of drivers using the East Expressway.

[6] In the PCR of Phase 3, the foreign currency portion of the project cost is expressed in yuan with the yen/yuan rate set at ¥15/yuan. Consequently, it does not equal the 4,103 million yen that was actually provided, of which 16,982 million yen was in Japanese ODA loans.

Table 1: Average Annual Daily Traffic (unit: vehicles/day)

Section	Planned	2001	2002	2003	2004	2005	2006	01–06 Rate of Increase
Haikou City – Dingan Prefecture	18,000	11,831	16,732	18,651	20,301	21,733	22,558	13.8%
Dingan Prefecture – Qionghai City		10,615	12,527	15,491	15,202	16,640	20,684	14.3%
Qionghai City – Wanning City	14,000	10,101	9,811	12,962	12,393	15,904	16,564	10.4%
Wanning City – Lingshui Li Autonomous County		7,881	8,786	9,238	10,979	12,619	11,530	7.9%
Lingshui Li Autonomous County – Sanya City		6,875	7,092	6,979	7,163	9,099	11,185	10.2%
Total		**47,303**	**54,948**	**63,321**	**66,038**	**75,995**	**82,521**	**11.8%**
Year-to-year growth rate			16.2%	15.2%	4.3%	15.1%	8.6%	

Source: Hainan Expressway Co., Ltd.

2.3.2 Reduction in Transportation Time

The total number of hours decreased through the five sections between Haikou to Sanya comes to about two and a half hours; thus nearly halving the time it used to take to cover the same distance. If one takes subtracts time spent at the two rest areas, an approximately 60% reduction in transportation time (about 4 hours) was achieved.

2.3.3 Frequency of Traffic Accidents

The number of traffic accidents declined since 2001; indeed, it has tended to increase. However, the ratio of the number of traffic accidents to the increase in traffic has remained steady at around 0.3%, which suggests that the skills for properly using high-speed roads have begun to take root. At any rate, the frequency of traffic accidents overall remains low in Hainan Province where the number of vehicles per person is low.

Table 2: Number and Frequency of Traffic Accidents on the East Expressway

Year	Number of Accidents	Frequency of Accidents
2001	118	0.25%
2002	179	0.33%
2003	209	0.33%
2004	233	0.35%
2005	239	0.31%

Source: Hainan Expressway Co., Ltd.

2.3.4 Cargo Transportation Volume in Hainan Island

Reflecting the increase in merchandize exports and raw material imports accompanying the industrial progress, shipping, which accounts for roughly a third of all freight volume, has recently been growing at an annual rate of 20%. On the other hand, road transport of industrial products in the island is limited and the rate of growth of freight volume is low. This suggests that the utilization rate of raw materials from Hainan is low and that factories are concentrated in port areas. Meanwhile, reflecting the increase in distribution of goods, road transport of cargo has increased to about 6%.

Table 3: Rate of Increase in Cargo Transportation Volume by Means of Transport

Means	1994–1996	2002–2006	2006 Share
Railroad	11.93%	46.81%	8.10%
Road	3.29%	5.98%	62.43%
Sea	10.70%	23.49%	28.50%
Air	18.97%	19.29%	0.97%

Source: Hainan Expressway Co., ltd.

2.3.5. Passenger Transportation Volume in Hainan Island

Road transportation has an overwhelming share of passenger transportation at 93.94%, and is growing at an annual rate of 6%. On the other hand, while its share of passenger transportation is only 3.03%, air transportation is growing at a respectable rate of 16–17% per annum, which suggests that the number of travelers choosing to fly is on the rise. However, there still has not been very much development of tourist sites along the East Expressway. Indeed, only a few tourists use the route that starts at the Haikou International Airport and passes through the tourist spots that dot the expressway before reaching Sanya. Instead, it appears that most tourists are apt to choose non-stop flights to Sanya including the direct flight from the Russian Far East that has recently been inaugurated.

Table 4: Rate of Increase in Passenger Transportation Volume by Means of Transport

Means	1994-2006	2002-2006	2006 Share
Railroad	0.62%	52.33%	0.19%
Road	5.58%	6.26%	93.94%
Sea	1.81%	13.83%	2.83%
Air	17.87%	16.39%	3.03%

Source: Hainan Expressway Co., Ltd.

2.3.6 Internal Rate of Return

In 1993, during the initial construction phase of this project, facing a shortage of construction funds, the provincial government's construction agency (Department of Hainan Transportation and Communications, Hainan Road Bureau, Commanding Headquarter of Hainan East-artery Highway Construction) was split up and privatized and became a business corporation, Hainan Expressway Co., Ltd. The latter was then listed on the Shenzhen Stock Exchange and 1.2 billion yuan in funds was raised. Furthermore, in January 1994, in order to ensure the financial health of Hainan Expressway Co., Ltd., a decision was made to eliminate the highway toll and a mechanism for imposing a vehicle fuel tax on gasoline and diesel oil as maintenance funds was created in its place. Specifically, in November 1995, the provincial government concluded an agreement to compensate Hainan Expressway Co., Ltd. Under the agreement, the latter would be provided with funds for paying back the long-term debts it would incur in the construction and operation and maintenance of the highway by applying the revenue raised by the fuel tax levied on gasoline and diesel oil. Consequently, the benefits from the financial internal rate of return (FIRR) would be the payment it would receive from the provincial government. Thus, it would be virtually meaningless to calculate any long-term benefits that might be derived from the project. Additionally, also with regard to EIRR, since the elimination of the highway toll makes it difficult to collect the necessary data, neither expenses nor benefits are calculated. The amount that is added to the price of gasoline or diesel oil as a vehicle fuel tax is estimated to be 1.36 yuan per liter in the case of gasoline. Thus, the revenue from the fuel tax levied on gasoline estimated from the number of registered vehicles in Hainan and the average amount of gasoline per vehicle consumed in China as a whole is believed to be about 530 million yuan per annum. On the other hand, the amount of money supplied by the government is estimated to be on average about 300 million yuan per annum (at peak hours, about 500 million yuan).

2.3.4 Qualitative Effects

In the ex-post evaluation carried out from October 2007 to March 2008, between October and November 2007, a beneficiary survey was conducted in the areas targeted by this project (6 cities and 1 prefecture in the eastern part of Hainan island). The survey randomly sampled and interviewed 100 people (29 in Haikou city, 14 in Dingan prefecture, 17 in Qionghai city, 20 in Wanning city, 14 in, Lingshui prefecture, 5 in Sanya city, and 1 in another location) ranging in age from 21 to 60 years of age and older (64% between 21 and 40 years of age and 31% between 41 and 60 years of age).

From the results of a questionnaire survey conducted on residents in the eastern part of Hainan, one can see that the effects of this project were by and large viewed favorably by the

residents of the surrounding areas.

• Means of transportation used	Bus: 39%, motorbike: 39%
• Work	Address inside a city: 47%
Use of the East Expressway:	
• For business	Several times a year: 36% Every day: 34%
• For daily living	Several times a year: 54% Every day: 22%
• Shortens hours	Very effective: 90%
• Reduces transportation cost	Very effective: 83%
• Contributes to regional economic development	Very effective: 82%
• Contributes to increase in income	Very effective: 61% Moderately effective: 33%
• Contributes to improvement of everyday life	Very effective: 61% Moderately effective: 27%
• Improves access to public facilities	Very effective: 69%
• Improves regional air pollution	Very effective: 53% Moderately effective: 24%
• Increases the number of registered vehicles	Very effective: 72% Moderately effective: 19%
• Reduces traffic accidents	Very effective: 68% Moderately effective: 20%

2.4 Impact

2.4.1 Economic Conditions in Hainan Province

Except for the period from 1996 to 2000 when Hainan's economy was in a slump(year-to-year growth of 4–7%), since 2004, the economy has been growing steadily in double digits every year, albeit at a slightly slower rate than the average growth rate of the entire nation. In 2006, the economy grew at a blistering rate of 16.5% or thereabouts.

Table 5: The Economic Conditions in Hainan Province

	1990	1995	2000	2005	2006	Average Annual Period Growth Rate (%)		
						90–06	95–06	01–06
GDP (100 million yuan)	10,249	36,417	51,848	90,360	1,05,240	15.70	10.10	13.20
Year-to-year average growth rate	—	28.9%	7.32%	11.75%	16.47%	—	—	—
Population (1000)	6,512.3	7,024.2	7,610.0	8,280.0	8,359.0	1.61	1.66	1.66
GDP/ person	1,574	5,185	6,813	10,913	12,590	13.78	7.73	10.35

Source: Hainan Statistical Yearbook 2007

Table 6: Economic Conditions in China as a Whole

	1990	1995	2000	2005	2006	Average Annual Period Growth Rate (%)		
						90–06	95–06	01–06
GDP (100 million yuan)	1,871,830	5,981,050	9,800,050	18,473,910	21,180,800	16.37	12.18	14.41
Year-to-year growth rate	—	26.15%	63.85%	88.51%	14.65%	—	—	—
Population (1000)	1,143,330	1,211,210	1,267,430	1,307,560	1,314,480	0.88	0.75	0.59
GDP/ person	1,637	4,938	7,732	14,129	16,113	15.45	11.08	13.65

Source: Chinese Statistical Yearbook 2007

2.4.1.1 State of Economic Development along the East Expressway

(1) Income of Residents

Except for residents of Qionghai city, the per capita income of people living along the East Expressway is showing double-digit growth. On the other hand, the rate of increase in the income of farmers has generally been low key; indeed, the incomes of farmers in Qionghai city and in the Lingshui Li Autonomous County have actually decreased. In other words, the disparity in income between urban and rural communities continues to widen, even after the construction of the East Expressway; thereby giving rise to a tendency in agriculture to scale down and manufacturing to expand its share in the industrial structure.

In summary, the rise in the income of farmers in the midland areas of Hainan island holds the key to economic development in areas along the East Expressway. Thus, expectations are high that the use of the East Expressway will facilitate the linkage between the modernization of agriculture and industrialization.

Table 7: Rate of Annual Average Income Increase Per Residents / Farmers / in Various Areas (2000–2004)

City/Prefecture	Residents	Farmers
Haikou City	10.80%	1.10%
Dingan Prefecture	14.30%	3.80%
Qionghai City	4.80%	-3.30%
Wanning City	13.00%	1.40%
Lingshui Li Autonomous	15.30%	-1.30%

County		
Sanya City	11.10%	0.10%

Source: Hainan Expressway Co., Ltd.

2.4.1.2 Investment and Trade Promotion

Direct investments in Hainan island by foreign companies have reached 9,800 cases[7], and the estimated value of these investments is 17 billion dollars, of which 11.5 billion dollars has already been invested. Investment by Taiwanese companies is particularly large, and the provincial government is pursuing a policy of further enhancing its economic, trade and cultural ties with Taiwan.

In foreign trade, Hainan Province imports more than it exports. But over the past several years, spurred by expanding exports, the trade balance has been improving rapidly.

Table 8: Foreign Direct Investment and Foreign Trade Value

(unit: US$1000)

Year	Direct Foreign Investment	Foreign Trade Value	
		Export	Import
2004	643,340	1,092,520	2,309,160
2005	684,010	1,022,540	1,569,210
2006	748,780	1,375,620	1,470,450

Source: Hainan Statistical Yearbook 2007

2.4.1.3 Contribution toward the Development of Tourism and the Tourist Industry

Since 1990, the number of tourists has increased at an annual rate of over 8%. With most tourists being domestic travelers, income from tourism has increased at an annual rate of more 10%.

The rate of increase in the number of foreign tourists is at the 4% mark, and the rate of increase in foreign currency revenue is just under 3%. Direct flights to Hainan island by foreign airlines, including those from Russia, have reached 30 per day. Along with national events such as national beauty pageants, many international events are often held that use the international conference facilities in Qionghai. These include the Annual Conference of the Asia Forum, the Agricultural Cooperation Forum, the World Youth Conference, and the International Tropical Agricultural Produce Winter Trade Conference. In addition, tourism along the East Expressway centering on Sanya is expected to continue to develop in the days to come. Among other things, this is evidenced by the fact that the Shangri-la Group, the overseas Chinese capital, is investing in resort development along the coast of the Shimei district in Wanning city (90 km from Sanya).

[7] Cumulative total up to the July 2007 period

Table 9: Principal Annual Rates of Increase of Tourism-based Economy (2000–2006)

	Unit	2000	2006	00-06
Number of Tourists	1,000	10,080	16,050	8.1%
Number of Tourists Staying in Hotels	1,000	10,080	16,050	8.1%
Domestic Tourists	1,000	9,593	15,433	8.2%
Foreign Tourists	1,000	487	617	4.0%
Revenue from Tourism	100 million yuan	78.56	141.43	10.3%
Domestic	100 Million yuan	69.51	123.57	8.7%
International	US$1,000	108,830	229,123	2.8%
Exchange Rate	Yuan/US$	8.316	7.795	—

Source: Hainan Expressway Co., Ltd.

2.4.2 Social Impact

2.4.2.1 Employment Promotion

As shown in Table 10, the number of employees is increasing at a steady pace in the two industrial categories (hotel and transportation) in areas along the East Expressway that have close ties with this project. However, echoing needs of the industrial area, transportation services are concentrated in the Haikou area.

Table 10: Changes in Number of Employees in Hotel and Transportation Industries (unit: persons)

Year		**Hotel**	**Transportation**
2003		30,540	34,859
2004		31,255	40,823
2005		30,663	41,218
2006		33,669	40,314
Rate of Increase		3.30%	5.00%
2006	Sanya City	14,680	4,639
	Haikou City	10,728	23,814
	Qionghai Prefecture	2,297	770
	Wanning Prefecture	2,403	618
	Lingshui	16	811

	Prefecture		
	Other	3,561	9,662

Source: Hainan Statistical Yearbook 2007

2.4.2.2 Promotion of Rural Economy

The lack of data makes it difficult to quantitatively verify the correlation between the economic improvements reflected in statistical figures and the construction of the East Expressway. However, the improvements made in the rural economy are explained by the effects of the impressive increase in the volume of goods distributed in Hainan island. In addition, hearings conducted with Hainan farmers reveal that the East Expressway is being used effectively to export fresh agricultural products such as melons to other parts of China.

2.4.3 Impact on the Environment

An environmental impact assessment (EIA) survey was conducted in the early planning stage of this project, but the project was not monitored afterwards. This is understood to be because the provincial government does not require executing agencies to monitor the impact projects have on the environment. In addition, in aiming to brand Hainan as an environmentally healthy island, the provincial government has adopted a basic policy that gave priority to the environment over the economy. And in line with this position, the government stresses that it gives the same meticulous consideration to highway operation and maintenance.

Moreover, true to Hainan's reputation of having the cleanest air in China, from the early phase of the implementation of the project, while protecting the ecological balance between organisms and their environments, under a policy of preventing formation of artificial sources of contamination as much as possible, in the construction and management of highways, sufficient consideration was given to, among other things, basic design, provision of temporary facilities, method of construction, land bridges, links to other roads in the vicinity of the project sites, management of water systems, and disaster prevention.

The need for land acquisition and resident relocation that emerged in connection with the implementation of this project was met by building consensus among the affected residents through various means, including holding dialogs with them, and by striving to limit the number of residents relocated and the area of land acquired. As a result, land acquisition and resident relocation were carried out appropriately and without incident.

As a result of its implementation, the effectiveness of the project was generally demonstrated as planned, and so the project was judged to be highly effective.

2.5 Sustainability (Rating: a)

2.5.1 Executing Agency

2.5.1.1 Operation and Maintenance System

In the early planning stages of this project, regarding operation and maintenance after the completion of this project, the Commanding Headquarter of Hainan East-artery Highway Construction (35 staff members, of whom 24 were technical experts) Department of Hainan Transportation and Communications, the Hainan Provincial Government was assigned to manage the overall operation, while the Institute of Highway Planning and Design of the Transportation Department (400 staff members, of whom 300 were technical personnel) was put in charge of the design and construction management. The Institute of Highway Planning and Design of the Transportation Department (hereinafter referred to as the "Design Institute") is one of China's leading design institutes with extensive experience in the design and construction management of highways.

Meanwhile, in April 1993, the aforementioned Commanding Headquarter of Hainan East-artery Highway Construction was split up and privatized and became Hainan Expressway Co., Ltd., and since then, the operation and maintenance of the East Expressway has been performed by the newly-formed Hainan Expressway Co., Ltd. The company has 56 technical staff members, and the operation and maintenance of the expressway is undertaken by one of its affiliates, Hainan Eastern-artery Highway. The company has 14 technical personnel in its headquarters, and another 87 at its various control centers (located in each of the cities and prefectures along the East Expressway), bringing the total of technical personnel to 101. Training for the company's operation and management personnel follows its usual training program, and a management manual is made available to facilitate the training.

2.5.1.2 Technical Status of Operation and Management

As for the actual maintenance procedure, the daily inspections as well as repair and maintenance are carried out by Hainan Expressway Co., Ltd. The periodic inspections are carried out by the provincial government's highway department, while large-and medium-scale maintenance and repair work is performed by Hainan Expressway Co., Ltd., which receives the order to carry out such work from the highway department (the Design Institute) of the provincial government. The latter submits the order after it designates the method of construction and appraises the repair cost. This order is submitted in accordance with a contract entered into by the provincial government and Hainan

Expressway Co., Ltd. (typically a 5-year contract, with a renewal clause). Consequently, the technical aspects of the maintenance are actually managed by engineers of the Design Institute, and Hainan Expressway Co., the contractor commissioned to perform the maintenance and repair work, is assigned to execute the engineering work under the direction and supervision of the Design Institute.

2.5.1.3 Financial State of Operation and Maintenance

The Government of Hainan Province secures the funds necessary for operating and maintaining the highways in Hainan island by using the revenue raised from the vehicle fuel tax levied on gasoline and diesel oil and other budgets as its source of financing, and a privatized operation and maintenance company operates and manages the highways with the money it gets from the provincial government. Meanwhile, East Expressway Co., Ltd. has a contract with the provincial government to operate and manage not only the East Expressway but the West Expressway and the Haiwen Expressway as well, and also deals in other businesses (hotel, real estate, advertising, etc.) as a private company. Thus, the financial sustainability of this project can be said to be dependent on the provincial government's maintenance capacity on the fiscal front. Nevertheless, in terms of business finance, what is important is the financial state of the privatized Hainan Expressway Co., Ltd. As far as one can determine from the company's earnings statements over the past 15 years, its internal revenue fund appears adequate. Thus, there appears to be nothing to indicate that the company has any financial problems. Still, it should be pointed out that the operation and maintenance expenses have risen sharply since 2000, causing the company to suffer from a small-scale current-account deficit ever since. However, since it is the provincial government that pays the cost of operating and maintaining highways, the factors responsible for the decline in profitability must lie elsewhere.

2.5.2 Operation and Maintenance Status

At this point in time, there are no outstanding problems with the operation and maintenance of the highways. Hainan Expressway Co., Ltd. and the Government of Hainan Province have concluded a long-term operation and maintenance contract, and the contract will remain valid until 2011. The actual operation and maintenance are comprised of two categories: (1) daily inspection and maintenance and repair work; and (2) medium- and large-scale maintenance and repair work. With regard to (2), the Government of Hainan Province will issue a budget and construction specifications on a case-by-case basis. Additionally, the operation and maintenance contract concluded between Hainan Expressway Co., Ltd. and the provincial government cover the East Expressway, the West Expressway, and the Haiwen Expressway. At present, work is

underway to renovate the surface of 100 km of the East Expressway at a cost of 440 million yen.

There are no doubts about the soundness of the operation and maintenance system and the capacity of the provincial government and that of Hainan East Expressway as executing agencies. Therefore the evaluation of the project is that it will have high sustainability.

3. Conclusion, Lessons Learned, Recommendations

3.1 Conclusion

In light of the above discussion, this project is highly evaluated.

3.2 Lessons Learned

(1) Taking into consideration the evaluation of long-term projects, like the one taken up in this ex-post evaluation, and the need to simplify the evaluation procedure, at the L/A stage, an appropriate milestone (markers delimiting the construction process) agreed upon with the government of the partner country should be installed. This will simplify the post-evaluation process, and help determine the time and reason when a delay in the process or an overrun in the project cost occurs.

(2) Results of the feasibility study (F/S) and actual results should be compared and the findings should be used to improve the technical quality of the F/S.

3.3 Recommendations

3.3.1 Recommendations to the Executing Agencies

The project period exceeded the planned period. The reasons include: (i) the privatization of one of the executing agencies; (ii) change in design necessitated by the difference in geographical condition; and (iii) change of plan in response to a request for change made by the local inhabitants. This state of affairs can lead to fatal cost overruns under conditions of high interest rates and inflation. Thus, it is desirable that a strict schedule control be applied at all times during the project implementation and the skills for managing the project be improved in a way that is appropriate for the conditions under which the project is being implemented.

3.3.2 Recommendations to JBIC

The period covered in this ex-post evaluation was excessively long, and the change in the details of the project, including the change in the conditions under which the

projects were implemented necessitated by the privatization of one of the executing agencies, made it difficult to verify the facts identified at the time of the ex-post evaluation. The period covered by ex-post evaluation should be split up into segments and the output of each segment should be evaluated separately.

Comparison of Original and Actual Scope[8]

Item	Plan	Actual
1. Output	1) 4-lane highways: total length 253km 2) Bridges (94 sites) 3) Tunnels (3 sites) 4) Exits (14 sites) 5) Tollgates (5sites) 6) Service areas (4 sites) 7) Parking areas (1 site) 8) Maintenance equipment (1 set)	1) As planned 2) 112 sites 3) As planned 4) As planned 5) 1 site (later removed) 6) 9 sites 7) As planned 8) None purchased
2. Project Period	Phases 1, 2: 87 months Phase 3: 28 months Total: 115 months	Phases 1, 2: As planned Phase 3: 33 months Total: 120 months
3. Project Cost Foreign Currency Local Currency Total ODA Loan Portion Exchange Rate	 18,229 million yen 42,000 million yen (local currency) 60,229 million yen 18,229 million yen 1yuan = 13.46 yen – 26.20 yen (1990–2000)	 16,982 million yen 55,771 million yen (local currency) 72,753 million yen 16,982 million yen 1 yuan = 14.02 yen –34.40 yen (1991–2002)

[8] This project was implemented over a period of approximately 11 years (January 1991 – September 2001). During this period, several changes were made in the original plan. They include: (i) change of executing agency; (ii) widening of the roads in stages; and (iii) provision of ODA loans in stages spanning three phases. As a result, the "plan" described above was substantially changed from 1990 when the Phase 1 ODA loans were provided. Changes in the exchange rate during this period, changes in commodity prices, design changes, and so on, impacted not only the project output but also the project period and the project cost.