Kenya

Cement Plant Rehabilitation Project

Report date: March 2001
Field survey: August 2000

1. Project Profile and Japan's ODA Loan

Site map: The suburbs of Nairobi in the Republic of Kenya

EAPC Athi River Plant

1.1. Background

Domestic demand for cement, the basic construction material, has grown significantly in line with the stable development of the Kenyan economy since 1984. Meanwhile, the capacity of existing cement production facilities had reached its limit and it was deemed difficult to meet growing domestic demand. At the time of appraisal, two cement plants were operating in Kenya. One is the Athi River Plant (annual production: approximately 300,000 tons) located in the suburbs of Nairobi, operated by The East African Portland Cement Company Limited. (EAPC), a state-run company in which the government holds a 52% stake. The other is located in Mombasa (annual production: approximately one million tons), and is owned by Bamburi Portland Cement Co., Ltd. (BPCC). The production facilities at EAPC's Athi River Plant in particular, were becoming increasingly obsolete and the production system was based on inefficient wet facilities. The plant could not therefore be expected to further increase production using existing facilities, and modernization was essential in order to meet domestic demand in a stable manner in the future.

1.2. Objectives

The objective of the project was to renovate and renew the cement production facilities of the existing Athi River Plant, located about 30 km southeast of Nairobi, with the aim of increasing production, and meeting the growing domestic demand for cement.

Table 1 Cement Supply and Demand Forecast in Case of Implementation (at appraisal)

(Unit: 1,000 tons)

	1989	1990	1991	1992	1993	1994	1995	1996
Domestic consumption	1,012	1,058	1,106	1,156	1,208	1,262	1,319	1,378
Domestic production	1,300	1,300	1,300	1,300	1,300	1,512	1,512	1,512
EAPC portion	340	340	340	340	340	552	552	552
BPCC portion	960	960	960	960	960	960	960	960
Exports	288	242	194	144	92	250	193	134

Source: JBIC materials

1.3. Project Scope

The ODA loan covered 85% of the total project cost. Specifically, it was used to procure civil engineering and construction work, materials and equipment, and the services required to renovate cement production facilities, including the replacement of the wet cement manufacturing process[1] with a dry process, and the replacement of obsolete facilities. It was also used to procure consulting services. The loan agreement was signed in March 1990.

1.4. Borrower/Executing Agency

The East African Portland Company Limited(EAPC) guaranteed by the Kenyan government/EAPC

1.5. Outline of Loan Agreement

Loan amount/Loan disbursed amount	¥7.674 billion/¥7.489 billion
Exchange of notes/Loan agreement	March 1990/March 1990
Terms and conditions	Interest rate: 2.5%, Repayment period (grace period): 30 years (10 Years), Partially untied
Final disbursement date	July 1997

2. Results and Evaluation

2.1. Relevance

The project was designed to fill the expected supply-demand gap for cement in Kenya and was considered relevant given the prevailing supply-demand situation. Due to declining growth in construction sector, however, growth in domestic demand for cement had peaked. For this and other reasons, cement production at the Athi River Plant remained at around 75% of the initial target. Behind this was the stagnation of the Kenyan economy triggered by a series of natural disasters that hit the country between 1997 and 1998 caused by El Nino, which was considered unpredictable and unavoidable. Therefore, the production plan was realistically reconsidered and

[1] In the wet process water is mixed with materials for calcination and extremely large volumes of energy are consumed as compared to the dry process, which does not employ water.

revised so that the initially scheduled annual production of 550,000 tons could be achieved in 2003, seven years after project completion.

2.2. Efficiency

The project was initially scheduled to start in April 1990 with the initiation of bidding and procurement procedures. However, it was postponed to September 1993 due to (1) the financial circumstances of the Kenyan government, (2) prolonged procedures for procuring contractors, and other factors. In addition, although trial operation was originally scheduled to last for three months, it actually took ten months. The project was eventually completed in March 1997, 36 months behind the initial target date of March 1994. The project implementation period lasted for 43 months from September 1993 to March 1997, however, and was within the initially projected 46-month range.

Planned costs totaled ¥9.028 billion (¥7.449 billion quoted in foreign currency and ¥222 million quoted in local currency) while actual costs totaled ¥11.041 billion (¥8.584 billion quoted in foreign currency and ¥2.457 billion quoted in local currency). The reason for the increase in total costs was that the price of the lowest tender exceeded the initially estimated cost. This overrun, arising from the difference between the project cost quoted in foreign currency and the amount of Japan's ODA loan, was covered by loans from the contractors. The actual disbursement was ¥7.489 billion as against the planned amount of ¥7.674 billion and was within the planned cost range.

2.3. Effectiveness

(2.3.1.) Cement Production

Production plans were reviewed after project completion (initial plans had called for the production of 550,000 tons immediately after completion) targeting annual production of 550,000 tons in 2003, the seventh year of operation. The major reason for this review was that cement demand cooled due to stagnation in the domestic economy. In addition, during the post-completion trial operation period it was revealed that the plant had lower combustion efficiency than initially planned. It was also pointed out that due to electric supply shortages in Kenya after 1997, it had become difficult to secure sufficient electricity for operation.

A look at the changes in cement production based on the reviewed plans indicates that it has continued to grow since the start of operation in 1997 and that in 2000, the plant produced 413,000 tons/year, achieving 90% of the planned figure of 440,000 tons/year. The operating rate was also reviewed in line with the downward revision of production plans. It has continued to rise since 1997, and in 2000, the plant

achieved an annual average operating rate of 67.9%, nearly 90% of the revised goal of 76.0%.

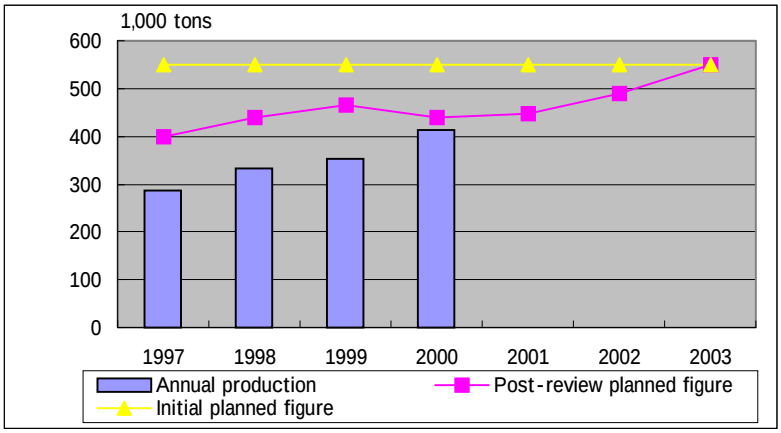

Figure 1 Changes in Production at EAPC's Athi River Plant

Table 2 Major Indicators for EAPC's Athi River Plant

Indicator		1996/97 (Project completion date)	1997/98 (2nd year)	1998/99 (3rd year)	1999/2000 (4th year)	2000/01 (5th year)	2000/02 (6th year)	2000/03 (7th year)
Annual production (1,000 tons) (Achievement ratio: %)	Plan	400	440	465	440	447	490	550
	Actual	287 (71.5%)	334 (75.9%)	354 (76.1%)	413 (93.9%)	-	-	-
Annual operating hours (hours)	Plan	n.a.	5,952	6,480	7,296	5,500	6,600	-
	Actual	4,621	5,382	5,286	4,888	-	-	-
Use rate* (%)	Plan	n.a.	n.a.	n.a.	n.a.	-	-	-
	Actual	51.8	63.1	70.5	62.3	-	-	-
Operating rate** (%) (Achievement ratio: %)	Plan	83.3	84.6	86.0	76.0	79.0	-	-
	Actual	64.2 (77.0%)	74.8 (88.4%)	73.4 (85.3%)	67.9 (89.3%)	-	-	-

Source: Replies to EAPC questionnaires
Note: *Use ratio = Annual production/ capacity × 100
**Operating rate = Annual operating hours/annual business hours × 100

There are three cement producers in Kenya today, and in 2000, BPCC held a 53% share of the domestic market and a 97% share of exports, EAPC had a 38% share of the domestic market and a 3% share of exports, and the newly established Athi River Mining, Ltd. (ARM)[2] had an 8% share of the domestic market and did not export its products. Exports were previously monopolized by BPCC, but in 1999 EAPC started exporting to the neighboring countries of Uganda, Rwanda and Tanzania. BPCC has already entered the Ugandan market to produce materials for cement, however, it is reported that the operating rate for its plant is low due to the stagnant Ugandan economy. Domestic cement prices for the three companies are almost the same though that for ARM is a little lower, and there are essentially no differences in price structure and quality level among the three. Currently, the pricing and quality level for EAPC products is almost comparable to those of its competitors. As in the

[2] Athi River Mining Ltd. (ARM) is so named because it is located on the Athi River, but it has no capital relationship with EAPC to which the Athi River Plant belongs. ARM's plant is controlled by BPCC.

Kenyan market, overseas markets are fixed in terms of market structure and manifest no fluctuations in scale, some are even shrinking. Therefore, as growth in the economy and construction sector in neighboring countries continues to stagnate, it is no easy task for EAPC to target increased export volumes or share in the export market. However, EAPC, is achieving results by increasing its exports, albeit gradually.

Table 3 Comparison of the Market Share of Cement Producers in Kenya in 2000

Companies	Market	Sales (KES 1,000)	Market share (%)
BPCC	Domestic	548,492	53%
	Export	224,870	97%
	Total	773,362	(Overall average) 61%
EAPC	Domestic	362,191	38%
	Export	5,109	3%
	Total	367,303	(Overall average) 32%
ARM	Domestic	82,649	8%
	Export	0	0%
	Total	82,649	(Overall average) 7%

Source: EAPC materials

(2.3.2.) Increased Production Efficiency

The project was expected to increase production efficiency by replacing the wet cement manufacturing process with the dry one. Pre-project combustion efficiency in 1988 was 1,385 kcal/kg-cl while the post-rehabilitation average combustion efficiency was 950 kcal/kg-cl. Although the latter failed to attain the initial target, it demonstrated that the project generated certain rehabilitation effects. On the other hand, unit electric power consumption worsened as compared to the pre-rehabilitation period. EAPC reports that there are problems with kiln calcination facilities and cement crushing systems and is considering more detailed surveys and replacement.

Table 4 The Production Efficiency of EAPC's Athi River Plant

	Target (At appraisal)	1996/97 (Project completion year)	1997/98 (2nd year)	1998/99 (3rd year)	1999/2000 (4th year)
Unit fuel consumption (kcal/kg-cl)	830	978	924	945	954
Unit electric consumption (kWh/t-cement)	71	n.a.	124	124	112

Source: Replies to EAPC questionnaires

(2.3.3.) Sales Costs

The replacement of the wet cement manufacturing process with the dry process was expected to lower the sales cost per ton of cement produced, by reducing fuel, supplies (spare parts) and maintenance costs. The actual sales cost per ton, excluding raw materials costs and depreciation expenses, was KES746/ton (inflation-adjusted real price) as compared to the KES610/ton initially predicted in

1989. Although the target was not attained, it improved as compared to the actual pre-project figure of KES846/ton.

Targets were met for packaging paper purchasing costs and selling expenses. Although targets were not met for fuel, supplies and maintenance costs, such costs were essentially reduced as compared to the pre-rehabilitation period. All these can be evaluated as project effects. Meanwhile, soaring raw materials costs, low combustion efficiency for certain plant facilities (particularly kiln calcination facilities and raw materials crushing systems), rising unit electricity prices and other factors increased relevant costs, keeping the overall cost of sales at almost the same level as in the pre-rehabilitation period.

Table 5 Sales Cost per Ton of Cement Produced

(Unit: KES/ton)

	At appraisal in 1989		Actual	Real price[1]
	Pre-project	Post-project (goal)	2000	
1. Raw materials costs	152.8	152.8	1,544.0	327.1
2. Fuel costs	326.8	200.4	1,263.0	267.6
3. Electricity use costs	82.0	77.0	857.0	181.6
4. Supplies and maintenance costs	233.8	128.6	897.0	190.0
5. Packaging paper purchase costs	81.5	81.5	366.0	77.5
6. Selling expenses[2]	122.1	122.1	140.0	29.7
Total cost of sales	999.0	762.4	5,067.0	1,073.5

Source: JBIC and EAPC materials

Notes: [1] The actual figures for 2000 were revised to real prices applicable at appraisal in 1989 using CPIs from the IMF International Financial Statistics.

[2] Including transport, advertising and publicity costs, etc.

(2.3.4.) Sales of Cement

Sales of cement continued to grow after project completion. They increased by nearly 60% from KES1.744 billion in fiscal 1996/1997, when the project was completed, to KES2.918 billion in fiscal 1999/2000. The ratio of operating profits to sales grew substantially, from 5.50% in fiscal 1996/1997 to 19.0% in fiscal 1999/2000. The project thus made a major contribution to increased cement sales at EAPC.

Table 6 Sales and Operating Profits of EAPC

(Unit: KES1,000)

	1996/97 (Project completion year)	1997/98 (2nd year)	1998/99 (3rd year)	1999/2000 (4th year)
Total sales	1,744,040	2,177,468	2,349,922	2,918,148
Operating profits (Ratio of operating profits to sales: %)	95,860 (5.50)	315,988 (14.51)	159,672 (6.79)	554,453 (19.00)

Source: EAPC annual reports

Note: Ratio of operating profits to sales = Operating profits / sales

(2.3.5.) Financial Internal Rate of Return (FIRR)

The initially predicted FIRR was 9.3%, but the results of recalculation to be 5.4%, lower than the initially predicted figure. One of the major reasons was weak

income from sales due to stagnant production. The assumptions for the calculation of FIRR are as specified below.

(Assumptions)

Project life: 15 years

Benefits: (1) Increases in sales income (on a factory shipment basis) due to increased production

(2) Reductions in unit production costs

Costs: (1) Rehabilitation costs

(2) Increases in variable costs due to increased production

(3) Increases in corporation tax due to increased income

2.4. Impact

(2.4.1.) Reduced Supply-demand Gap in the Domestic Market, etc.

Due to the stagnant Kenyan economy in the early 1990s and during the period after 1988, the predicted supply-demand gap did not occur in the domestic market. Actual cement production under the project, however, was 413,000 tons in 2000. Given that total domestic cement production was 1.216 million tons and total domestic consumption was 1.06 million tons, production realized under the project attained a considerable share of the domestic market. Therefore, the project is considered to have reduced the supply-demand gap and to have also contributed to foreign currency savings and gains.

Table 7 Changes in Cement Supply and Demand

		1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Domestic consumption (1,000 tons)	Forecasts (At appraisal)	1,012	1,058	1,106	1,156	1,208	1,262	1,319	1,378	-	-	-	-
	Actual	1,012	1,106	1,135	1,148	970	848	1,045	1,130	1,194	1,068	1,020	1,060
Domestic production (1,000 tons)	Forecasts (At appraisal)	1,300	1,300	1,300	1,300	1,300	1,512	1,512	1,512	-	-	-	-
	Actual (EAPC's share)	1,300 (340)	1,300 (340)	1,300 (340)	1,300 (340)	1,300 (340)	1,300 (340)	1,300 (340)	1,300 (340)	1,229 (284)	1,104 (334)	1,243 (354)	1,216 (413)
Real GDP growth rate* (%)		-	4.2	1.4	-0.8	0.4	2.6	4.4	4.1	2.1	-10.7	1.6	n.a

Source: JBIC materials, EAPC replies to questionnaires, overseas economic cooperation handbooks and the World Bank Web site

* For real GDP growth rates, data from overseas economic cooperation handbooks are used. Data from the World Bank Web site were utilized for the 1999 figure.

(2.4.2.) Environmental Impact

In order to eliminate powder and dust generated during production, the Athi River Plant uses electric dust collectors (in compliance with domestic laws and regulations and the World Bank's environmental standards). There are private residences in the neighborhood of the plant, but no damage due to powder and dust discharged by the

plant has been reported to date. In addition, the results of a 1997 survey of the amounts of discharge by principal facilities, after the project was completed, indicated that the amounts for all facilities were lower than the prescribed standards. In 1999, the Kenyan government enacted the Environmental Management and Coordination Act as part of its new environmental policies; the law was enforced in January 2000. The government is thereby establishing a new environmental framework, including the establishment of a new organization for environmental administration and the development of new environmental guidelines. In the past, the production division of the EAPC plant was responsible for environmental monitoring, but in response to the recently tightened environmental regulations, EAPC has formed a new environmental monitoring unit. It is thus working hard to establish a system to meet new environmental standards.

2.5. Sustainability

EAPC is a state-owned enterprise in which the Kenyan government is the majority stockholder with a 52% stake. Currently, it has 510 employees of which 322 are engaged in actual operations (cement production) at the Athi River Plant (180 for production, 92 for engineering and 50 for operation). Operation and maintenance are collectively undertaken by the production and operation divisions under the leadership of technical experts from the engineering division. Technical experts are dispatched to contractors for training and on-site training is also provided. In addition, Indian engineering consultants have been engaged to conduct training with the aim of giving personnel new technical expertise and improving their skills to facilitate stable operation. A system for operating and maintaining plant facilities has been established with repair workshops being constructed within the precincts and the use of manuals and computer systems to control parts inventories, etc. At present, there are no major technical problems with the running of plant facilities or with overall operation and maintenance. However, heavy rainfall in 1997-1998, induced by El Nino caused the raw materials storage facilities to subside, warping the rails for raw material transportation and hindering the smooth operation of production lines. EAPC has drawn up rehabilitation plans, but has no prospect of procuring the necessary funds for implementation.

With respect to the growth potential for the project, sales have grown steadily, and in fiscal 1999/2000, EAPC achieved a very high level of performance, posting an operating profits/sales ratio of 19.0%. However, because of increases in personnel and financial expenses[3] due to increased hiring and rising commodity prices, and foreign exchange losses, EAPC suffered losses for two consecutive years, in fiscal 1998/1999 and 1999/2000. In particular, the annual revaluation of the exchange

[3] EAPC started to repay the interest on the ODA loan in 1997 and the principal thereof in 2000.

rate of the Kenya shilling against the Japanese yen generated substantial exchange losses associated with ODA loan. The accumulated losses for fiscal 1999/2000 soared to approximately KES700 million mainly because the exchange rate declined from KES1.00 = ¥6.67 in 1990 to KES1.00 = ¥1.35 in 2000. EAPC intends to improve its financial structure by eliminating accumulated losses over the next five to six years. In its annual plan for fiscal 2000/2001, it is targeting a 40% share of the domestic market and a 3% share of exports and a reduction in production costs by 20%.

Table 8 Income Statement for EAPC

(Unit: KES1,000)

	1996/97 (Project completion year)	1997/98 (2nd year)	1998/99 (3rd year)	1999/2000 (4th year)
1. Total sales	1,744,040	2,177,468	2,349,922	2,918,148
2. Operating profits (Ratio of operating profits to sales*:%)	95,860 (5.50)	315,988 (14.51)	159,672 (6.79)	554,453 (19.00)
3. Interest income	63,079	9,524	18,213	52,391
4. Interest expense	-47,602	-165,096	-115,781	-145,488
5. Exchange gain/loss	n.a.	383,929	-1,356,747	-1,000,216
6. Pre-tax current profit/loss	111,337	499,452	-1,294,643	-538,860
7. Taxes	20,838	123,745	-416,057	-119,392
8. After-tax current profit/loss	90,499	375,707	-878,586	-419,468
9. Dividends	60,000	90,000	0	0
10.Current profit surplus/deficit	30,499	285,707	-878,586	-419,468
11.Profit/loss per share (KES)	1.00	4.17	-9.76	-4.66

Source: EAPC annual reports

* Ratio of operating profits to sales = Operating profits / sales

Table 9 The Financial Status of EAPC

(Unit: KES1,000)

	1996/97	1997/98	1998/99	1999/2000
Financial results				
(1) Total Assets	5,559,978	5,790,621	6,305,014	8,083,428
(2) Current assets	409,355	714,248	1,100,704	1,550,805
(3) Current liabilities	403,328	544,735	711,765	802,472
(4) Shareholders' equity	1,414,499	1,700,206	821,620	1,625,576
(5) Sales	1,744,040	2,177,468	2,349,922	2,918,148
(6) Net income	111,337	499,452	- 1,294,643	- 538,860
(7) Balance of loans from the Kenyan government	37,675	37,675	35,271	32,866
(8) Balance of Japan's ODA loan	3,515,666	3,168,721	4,519,982	5,399,320
(9) Accumulated losses	-	-	- 278,480	- 697,948
Financial indicators				
Rate of profit to total assets (%) (6)/(1)	2.00	8.63	- 20.53	- 6.67
Rate of net profit to sales (%) (6)/(5)	6.38	22.94	- 55.09	- 18.47
Turnover of total Assets (times) (5)/(1)	0.31	0.38	0.37	0.36
Liquidity ratio (%) (2)/(3)	101.49	131.12	154.64	193.25
Net worth ratio (%) (4)/(1)	25.44	29.36	13.03	20.11

Source: EAPC annual reports

Note: In fiscal 1999/2000, profits from the revaluation of land, buildings and other fixed assets arose and these profits were reported as capital reserve.

Comparison of Original and Actual Results

Item	Plan	Actual
1. Project scope		
(1) Materials processing		
· Establishment of new materials storages	8,000 t × 4 units, 1,000 t × 1 unit	8,000 t × 2 units, 3,500 t × 1 unit
· Renewal of Materials crushing mills	Facility capacity: 130 t/day	1,000 t × 1 unit
(2) Calcination process		
· Replacement of the wet kiln with the dry one	Production capacity: 1,600 t/day	Same as left
(3) Crushing process		
· Improvement of cement crushing facilities	Replacement	Same as left
· Establishment of new cement packing facilities	Facility capacity: 70 t/hr	Facility capacity: 100 t/hr
(4) Other		
· Establishment of electric facilities	Diesel power generator 500 kVW	Same as left
(5) Consulting services	110 M/M	135.7 M/M
2. Implementation schedule	April 1990 to March 1994 (48 months)	September 1993 to March 1997 (43 months)
3. Project cost		
Foreign currency	¥7.449 billion	¥8.584 billion
Local currency	¥222 million	¥2.457 billion
Total	¥9.028 billion	¥11.041 billion
ODA loan portion	¥7.674 billion	¥7.489 billion
Exchange rate	KES1.00 = ¥7.11 (Calculation base date: July 1989)	KES1.00 =¥2.02 (Calculation base date: July 1997)