Botswana

Trans-Kalahari Road Construction Project

Report date: March 2001
Field survey: August 2000

1. Project Profile and Japan's ODA Loan

Site map: The Republic of Botswana

Trans-Kalahari Road

1.1. Background

The Republic of Botswana has a population of just 1.3 million as compared to its vast land mass (approximately 1.5 times the size of Japan) and is one of the most sparsely populated countries in the world. Eighty percent of the population is concentrated in the eastern part of the country, which is the center of social services, including education and health care, transport infrastructure, including railways and roads, and economic activities, while the western part of the country remains underdeveloped. To realize a well-balanced society and economy, it was important to develop a country-wide road transport network.

Topographically, Botswana is a landlocked country bounded by South Africa to the south, Zimbabwe to the east, Namibia to the west and Zambia and Angola to the north. Access to neighboring countries is essential for exchanges of human resources, as well as trade and distribution, but there had been no access to Namibia, which is located west of Botswana. The Southern African Development Community (SADC)[1], the former Southern African Development Co-ordination Conference (SADCC), which includes Botswana, planned to connect Mozambique's Maputo Port, located in southeastern Africa, and Namibia's Walvis Bay Port, located in southwestern Africa.

[1] SADC was founded in 1992 after the reorganization of SADCC, formed in 1980. The organization aims to achieve unification of regional economies and serve as a contact for coordination of aid to the regions of Southern Africa. As of January 1999, SADC comprised 14 member countries: Botswana, Zimbabwe, Tanzania, Zambia, Lesotho, Swaziland, Malawi, Angola, Mozambique, Namibia, South Africa, the Democratic Republic of the Congo, Seychelles and Mauritius. It is headquartered in Gaborone, the capital of Botswana.

The Trans-Kalahari Road Construction Project, which covers the section between Sekoma and Mamuno, was part of the plan, and was expected to contribute to trade both in Botswana and among neighboring SADC member countries.

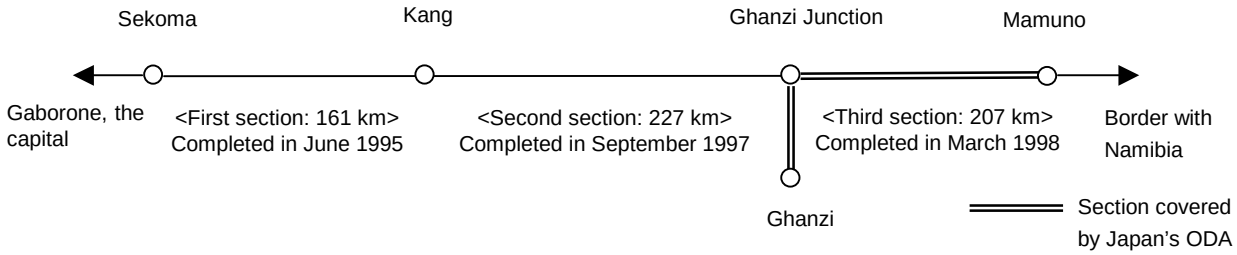
1.2. Objectives

This project aims to build a single-lane 589-km permeable asphalt road linking Sekoma, Ghanzi and Mamuno, thereby promoting distribution between east and west Botswana and contributing to economic growth via increased trade among SADC countries.

1.3. Project Scope

The Trans-Kalahari Road Construction Project was co-financed by a Japanese ODA loan, the African Development Bank (AfDB), African Development Fund (AfDF), Arab Bank for Economic Development in Africa (BADEA) and Kuwait Fund. The project consisted of three major construction sections. The first, which covered the 161-km Sekoma-Kang section, was financed by BADEA and Kuwait Fund. The second, which covered the 227-km section between Kang and the Ghanzi junction, was funded by AfDB and AfDF. The third, which covered the 207-km Ghanzi-Mamuno section, was financed by the Japan Bank for International Cooperation (JBIC). (At the time of appraisal, Ghanzi had a population of approximately 5,000 and was the largest city within the project area.)

As mentioned above, Japan's ODA loan funded the construction of the third road section and covered all costs quoted in foreign currency for procuring materials, equipment and services required for construction work under the project. (AfDB covered all expenses for procuring construction supervision consulting services and other operations for the section.)



1.4. Borrower/Executing Agency

The government of the Republic of Botswana/The Road Department, Ministry of Works, Transport and Communications

1.5. Outline of Loan Agreement

Loan amount/Loan disbursed amount	¥3,661 million/¥3,661 million
Exchange of notes/Loan agreement	March 1992/February 1993
Terms and conditions	Interest rate: 3.0%, Repayment period (grace period): 25 years (7 years), General untied
Final disbursement date	August 1998

2. Results and Evaluation

2.1. Relevance

The goal of the Trans-Kalahari Road Construction Project was to link eastern Botswana, home to the capital and other cities, and the sparsely populated areas in the west, and was essential for promoting the economic development of the latter region. It was also essential as a means of facilitating future economic exchange and revitalizing regional markets both in Botswana and in neighboring SADC countries, by directly connecting Botswana and Namibia. Thus theproject remains relevant. In addition, not only does the third section funded by Japan ODA loan form part of the main route of the Trans-Kalahari Road, it also links Ghanzi to the main route of the road, in consideration of future growth.

2.2. Efficiency

(2.2.1.) Implementation Schedule

The initial schedule for the project spanned 55 months from December 1992 to June 1997, but the project actually took 49 months from March 1994 to March 1998 to complete. The major reasons for the delay were (1) there was a gap of about two years between soliciting bids from prospective contractors and its approving by JBIC , and (2) project designs were reviewed rendering part of the project (removal of shrubs and weeds and other work) more labor-intensive.

(2.2.2.) Project Cost

The actual project cost was ¥4.696 billion as compared to the ¥4.727 billion initially estimated and was within the planned scope.

(2.2.3.) Organization

In implementing the project, the Road Department appointed its deputy director-general as project coordinator and assigned a senior road engineer to each section, to supervise construction. Meanwhile, overall monitoring of construction was undertaken by the planning unit of another department in the Ministry of Works, Transport and Communications in cooperation with the Road Department. In addition, chief road engineers, environmental experts, transport economy experts and other specialists provided technical support by assuming responsibility for training programs. Environmental monitoring in the planning and implementation of the project was undertaken by environmental experts. In Botswana, the National Conservation Strategy (Coordination) Agency (NCSA), a government organ responsible for environmental administration, conducts environmental monitoring on a nationwide scale, however, the Road Department has continued to perform this role for the Trans-Kalahari Road with the cooperation of NCSA since project completion. During the project, construction was supervised by consultants employed via the

AfDB loan. These consultants and the construction contractors had appropriate technical skills thus facilitating coordination and cooperation among all connected parties, and allowing costs to be well managed so as to be within the planned scope. Thus, aside from the delays in the schedule for bidding procedures, the project was efficiently implemented.

2.3. Effectiveness

(2.3.1.) Effects on Traffic Volume

The average daily traffic volume between Ghanzi and the Ghanzi junction was 110 vehicles in 1999 as compared to the 45 vehicles initially forecast indicating an increase in traffic volume although the measurement was conducted immediately after project completion. It is not possible to assess the effects of the project on the traffic volume between the Ghanzi junction and Mamuno because the executing agency is not in possession of relevant traffic data.

(2.3.2.) Effects on Reductions in Traveling Time

The most remarkable effect of the project on the road and its vicinity is considered to the reductions in traveling time. Prior to completion of the project, the existing road was poorly paved with the majority unpaved. Particularly in western Botswana, roads were underdeveloped, and residents faced lengthy travel times. The completion of the project improved transportation in western Botswana, and the executing agency reports that overall traveling times in the region have been dramatically shortened.

(2.3.3.) Recalculation of the Economic Internal Rate of Return (EIRR)

The results of recalculation of the EIRR indicated that EIRR was 2.1% (5% at appraisal) if transit traffic was not included and that it was 27.72% (20% at appraisal) if transit traffic was included. After completion, the consultants reviewed the projected traffic volume based on actual traffic volumes measured after a feasibility study (the growth rate for the predicted ordinary traffic volume was revised downward, while that for transit traffic volume was revised upward against study prerequisites). The reviewed predicted traffic volumes were also used to recalculate EIRR. These figures, however, are strictly estimates because the executing agency does not possess traffic data for the section between the Ghanzi junction and Mamuno, and the data are not systematic. The preconditions for benefits and costs are as specified below.

(Preconditions)

- Project life: 25 years
- Costs: Project cost (initial investment) and operation/management cost (the

difference between operation and maintenance costs incurred when the project was implemented and those which would have been incurred if the project had not been implemented)

- Benefits: Benefits in terms of driving and time saving

2.4. Impact

(2.4.1.) Environmental Impact

During the planning stage, it was pointed out that road construction might pose a major environmental problem, hindering the free movement of wild animals and livestock along the road. For this reason, initial plans were revised and various measures were taken to eliminate environmental concerns. Measures included installing no fences along the road except along certain sections to minimize limitations on the movement of wild animals and grazing livestock and the provision of watering places for livestock along the fences at certain intervals. The Road Department reports that these measures enabled negative environmental impact to be minimized. On the other hand, however, it is also true that this gave free passage to wild animals and livestock, causing temporary blockages and frequent traffic accidents. NCSA conducted a baseline survey in 1998 with the assistance of AfDB (completed in January 2001) and executed environmental monitoring on a nationwide scale based on the results of the survey, targeting completion by June 2001. It is therefore necessary to await the publication of the results before a detailed evaluation of the impact of the project on the environment, such as its effects on wild animals and the lives of stockbreeders, which was predicted at the time of planning.

(2.4.2.) Social and Economic Impact on Local Communities

The results of field survey this time confirmed that the project had facilitated steady advances in the development of communications services for neighboring areas as well as gas stations, automobile maintenance workshops and other facilities. In addition, residents in neighboring areas now enjoy greater convenience with more opportunities to access health care and education. Furthermore, substantial improvements in transportation between cities and provincial areas have invigorated the economic activities of small- and medium-sized corporations, contributing to the creation of new job opportunities.

For example, prior to completion, Ghanzi, located in the Kalahari Desert and where the evaluation mission visited, had only gravel roads with no access to main trunk roadsand offered no bus services or other large public transport facilities. After completion, however, a bus service running several times a day was started between Ghanzi, the capital city of Gaborone and Mamuno. Distribution, trade and

exchange of human resources prospered and Ghanzi has developed rapidly as a result to become a major city in northwest Botswana. In addition, since the Trans-Kalahari Road was extended to Ghanzi, the project has triggered the development of new infrastructure by local governments including the paving of roads.

2.5. Sustainability

The administration, operation and maintenance of roads, including the Trans-Kalahari Road, which are controlled by the Road Department, is chiefly undertaken by the operation and maintenance section as well as by regional offices throughout the country. The regional offices have a total of ten depots, four in the north, four in the south and two in the west. The Road Department currently has some 2,500 employees of which 1,500 are engaged in administration, operation and maintenance of roads. The Ghanzi-Mamuno section of the Trans-Kalahari Road covered by the project is predominantly supervised by 114 personnel at the Ghanzi depot.

Road administration, operation and maintenance are based on the Pavement Management System[2] utilizing computerized databases. Routine maintenance, including weeding and repair of roadside fences, is performed by the regional offices once a year. Regular maintenance work for traffic-control signs, weighing stations, road markings and other facilities, is undertaken by the operation and maintenance section of the Road Department once every four years. Repairs to hard shoulders, potholes and other irregularities are performed as necessary. Weighing stations have been established at ten locations nationwide to control overloaded trucks that cause damage to roads and shorten their useful life. Thus efforts are also being made to take preventive measures. A look at operation and maintenance budgets shows that the actual operation and maintenance costs in 1999 totaled 60 million pulas, accounting for approximately 44% of the Road Department's total budget, which stood at 138 million pulas. This indicates that the department places emphasis on securing funds for, and allocating budgets to, operation and maintenance as well.

In recent years, the Road Department has reconsidered its operating methods as part of its efforts to implement institutional reforms. In the past, the department used an in-house maintenance system via which departmental engineers directly administered, operated and maintained the roads, and materials and equipment were

[2] The Pavement Management System was introduced under the seventh national development plan that covered the period from 1991/1992 to 1996/1997. Information on the condition of all roads is stored in computerized databases and the data used to compile optimal road maintenance schedules. This prevents the roads from deteriorating and prolongs their useful life, thus reducing costs required for road rehabilitation.

procured/managed internally. However, there has been a shift to outsourcing, and approximately 80% of road works (in terms of road length) is currently entrusted to the private section. Following this shift, the operations of the department have diversified to cover a wide range of supervisory duties, including administration, operation and maintenance planning, budgeting, contractor management, and quality control for construction. The function of the department is changing from that of executor to a supervisory or coordinating role. It cannot be said, however, that departmental personnel have sufficient skills, know-how and management abilities to fulfill the requirements of this new function. For example, if regular maintenance work is outsourced to private enterprises, contracting and contract management are undertaken by the head office of the Road Department, and with approximately 5-6 contracts being concluded annually (the majority of contractors are major private sector constructors). By contrast, contracting and contract management for routine maintenance work are mainly undertaken by regional offices, with some 45 contracts concluded annually (15 per office). In the latter case, duties related to a series of procurement procedures, including the preparation of contract documents, as well as the invitation and evaluation of tenders, are also performed by regional offices. In addition, the regional offices have to invite tenders in accordance with the government's procurement rules and regulations and obtain approval from the Central Tender Board for the results of evaluation. These duties require special skills in procurement and contract management in addition to traditional skills mainly in the fields of road administration and engineering. The Road Department, however, has insufficient engineers capable of performing these duties. Particularly at regional offices, which handle a large number of contracts, only a limited number of personnel are engaged in contract management. The Road Department is urged to further strengthen its contract management system.

Meanwhile, only a limited number of private enterprises have sufficient levels of personnel, construction equipment and technical skills to execute road operation and maintenance. According to the Road Department, cases in which private contractors that have undertaken such work but prove unable to provide sufficient services due to lack of technical capabilities are frequent, causing trouble to the department. The Central Transport Organization, a government organ, owns, manages and leases construction machinery and repair equipment for road construction and repair. Such machinery and equipment is only available to government-related organizations, and private enterprises have to procure such machinery and equipment independently. Improving technical abilities in the private sector is also an issue to be addressed in the future.

Under these circumstances, the Road Department is providing training to its

engineers on a continuous basis with the assistance of AfDB. As an executing agency, it has worked hard to raise the technical level of its personnel and has sent 22 staff members to the US and Europe to study at universities and graduate schools. Additionally, it offers personnel medium- and long-term advanced and specialized education and training programs. Furthermore, support measures for developing and strengthening private-section personnel who are actually engaged in road operation and maintenance are under consideration. Thus plans for improving administration, operation and maintenance systems in the road section are being promoted.

In recent years, there have been discussions among government officials concerning the incorporation of the Road Department, and the government is considering turning it into a public corporation. Although department executives state that its future direction has not yet been decided, these discussions may affect the road administration, operation and maintenance systems. Meanwhile, the Road Department has recently been pushing forward with plans to streamline its organization by reducing personnel.

Comparison of Original and Actual Results

Item	Plan	Results
1. Project scope	(a) Section: Ghanzi to Mamuno (b) Total length: 207 km (of which 42 km are a road that connects Ghanzi with the main road) (c) Number of lanes: 2 (one each way) (d) Width: 9.1 m (of which 7.0 m are the roadway) (e) Design speed: 120 km/h (f) Pavement structure: Permeable asphalt pavement Two-layer surface processing (3 cm) The upper and lower roadbeds are 15 cm thick, respectively.	(b) Total length: 213.5 km (of which 48.9 km are a road that connects Ghanzi with the main road) Same as left for other items.
2. Implementation schedule	December 1992 to June 1997 (55 months)	March 1994 to March 1998 (49 months)
3. Project cost Foreign currency Local currency Total ODA loan portion Exchange rate	 ¥3,661 million ¥1,066 million ¥4,727 million ¥3,661 million BWP1.00 = ¥68.50	 ¥3,661 million ¥1,035 million ¥4,696 million ¥3,661 million0 BWP1.00 = ¥36.07