

CHAPTER 3

Chapter 3 Project Evaluation and Recommendations

3-1 Project Effect

This project is targeted at economic development and improvement of the livelihood of the people in the roadside regional society, including the bridge concerned. The project includes reconstruction of the bridge, currently a temporary bridge used as an ad-hoc measure, washed away by flood possibly due to El Nino, to a permanent bridge, with the aim to remove the hindrance to traffic, stabilize of the livelihood of the people of regional societies, and promote regional activities in addition to promoting investment and development through the improvement of road conditions and securing administrative efficiency as a part of the regional road development plan of Kenya.

The area covered by this project is suffering delayed development of infrastructure necessary for the social life because of the lagging road development of Road B7, so development of this social infrastructure is currently being conducted through the improvement of Road B7. The bridge on this route is currently a temporary bridge, and considering that the vehicle weight limitation makes passage of heavy vehicles impossible and the width is not enough to allow the traffic in both directions, bridge rehabilitation is urgently needed. There are great expectations on the grant aid to support such rehabilitation for development of the social infrastructure.

Direct and indirect effects of this project are as shown in the table below.

1) Direct effects

Direct effects expected within the project area are summarized in the table below.

Table 3-1 Direct effects of the project

Present state and problems	Measures of the project	Direct effects of the project and degree of improvement
1. Existing piers are washed away during flood and left as it is. Due to scouring and collision of drift wood, there is a danger of breakdown, bridge collapse.	- Reconstruction of the new bridge and raising of the road along with embedment of abutment/pier and slope protection of access road are made to ensure the structure that can resist flooding.	- Through assuring of year-round traffic throughout the year and improvement of travel, people's livelihood may be stabilized by ensuring medical and safety in case of emergencies for current bridge users.
2. Two bridges covered by the project are temporary Bailey bridges with a weight limitation applied of 25 ton. Industrial large trucks cannot pass over the bridges.	- Reconstruction to create concrete bridges through the application of the current bridge design live loads HA and HB30 units that are based on the Kenyan standard.	- Industrial large sized vehicle will be passable. - Mass transport becomes possible, causing decrease in freight cost and its time.
3. Being Bailey bridges, these bridges have a width of only about 4 m. Vehicle traffic is alternating using one lane.	- On the basis of projections of future traffic volume and the B7 road improvement plan, a carriageway width of 8 m with two lanes will be constructed.	- Elimination of alternating traffic will ensure smooth vehicle traffic.
4. Being Bailey bridges, these bridges have no sidewalk, resulting in a mixture of pedestrians, bicycles, and vehicles on the bridge, which is not safe.	- A 1.5 m wide sidewalk will be provided on both sides in the case of Athi Bridge where there are many pedestrians and on one side in the case of Ikutha Bridge where there are relatively few pedestrians.	- Separation of sidewalk and carriageway ensures higher traffic safety for both pedestrians and drivers.
5. The existing Athi Bridge is shorter relative to the river width upstream and downstream of the bridge, creating a bottleneck in the river flow and thus an obstruction. There is also a high possibility of drift wood, etc. striking against abutment and pier.	- The Athi Bridge length was extended by just under 20 m to 120 m in consideration of the river condition upstream and downstream of the bridge. - Both bridges will have a clearance appropriate to the high water level expected once in 50 years. The span was also extended.	- The bridge safety will be enhanced through reduction of the possibility of drift wood colliding with abutment and pier.

2) Indirect effects

Reconstruction of Athi and Ikutha Bridges will make improvements currently underway on B7 Road in Kenya more effective, offering indirect effects in the flow from the outside to inside of project area and among areas outside the project area.

Table 3-2 Indirect effects of the project

Present state and problems	Measures of the project	Indirect effects of the project and degree of improvement
1. Large vehicles exceeding 25t cannot run on B7 road covered by the project, making detour.	- Reconstruction to create concrete bridges through the application of the current bridge design live loads HA and HB30 units that are based on the Kenyan standard.	- Promotion of freight transportation caused of ensuring road traffic function of B7 road will make local economy of Makeni and Kitui revitalizing. - Ensuring road traffic function of B7 road will contribute scheme on road network improvement what is planned by Kenya.
2. There are many other damaged bridges in covered area.	Due to reconstruction, existing bailey bridges at Athi and Ikutha will be surplus.	- Surplus parts of bridges can be diverted other damaged bridges.

3-2 Recommendations

Improvement and development on following points will make this project further effective:

In order to achieve and sustain effects of this project, Kenya must face the following challenges:

[Regarding the effect as a new bridge]

- Removal of the existing bridge

[Regarding the effect as a road]

- Improvement of about 3 km section of existing ordinary road as an access road on the left bank of Athi Bridge
- Improvement of the entire B7 Road

In order to achieve and sustain the effects as a bridge proper, removal of the old bridge is essential because it acts as a bottleneck in the river flow due to interaction between

the bridge and river, hindering the flow and adversely affecting the safety of the new bridge.

Concerning the access road on the left bank of Athi Bridge, it is necessary to improve about 3 km of existing regional road and connect it to the existing B7 road to ensure smooth traffic flow. This improvement is scheduled to be done by Kenya as a part of this project, and it is necessary to ensure that such improvements are continued without fail.

Reconstruction of Athi and Ikutha Bridges will enable the passage of large vehicles exceeding 25 tons. To enhance the effectiveness of both bridges, there is a need to continually ensure the implementation of improvement of the whole of B7, which is currently under way. Improvement of this road includes improvement of the road alignment as a B-standard road, conversion from the unsealed to asphalt paved road, and improvement of drift at crossings of small rivers that are the largest bottleneck in traffic flow.

There are about 12 drifts that require improvement. Reconstruction to the relevant pipe culvert, box culvert, or small-medium bridges is necessary if smooth traffic flow is to be secured. Though the Kenya counterpart can perform construction of these structures technically, securing of the financial resources will be the largest issue to overcome. In order to construct these structures as early as possible, the application of the non-project fund accumulated through aid from Japan should be considered.

(1) Extension of the access road on the left bank of Athi Bridge

- Improvement of the existing road of approximately 3 km as an access road to existing B7 road

(2) Implementation of the improvement plan of the whole of B7 road

- Improvement of road alignment appropriate as the B class road
- Rehabilitation of drifts at crossings of small rivers
- Improvement of road pavement : Improvement from gravel road to asphalt concrete paving.