Sustainable and inclusive transport development of Khulna City

Presented by
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Khulna, Bangladesh
Location of Khulna City in respect of Bangladesh
Existing Road Network of Khulna City

• Efficient circulation network is one of the key elements in future growth and prosperity of a city.

• The present condition of transport facilities in Khulna is fairly good. But to cope with the future growth of the city and the development likely to be caused by the use of Mongla Port by increasing international trade with industrialization through EPZ and subsequent expanding trade and commerce, there is a need to take up transport development programmes in night earnest from now.

• Khulna has a fairly good transportation system consisting of road, river and railway network. River and rail transportation was prominent in the past, but with the passage of time road network is getting an edge over the water and rail transport. Although Khulna is a metropolitan City, ranking third in the country, it conspicuously lacks an airport.

• Khulna City stands at a transit point between the Mongla Port, the regional urban centres and the rich agricultural hinterland.
• Currently there exists a good road, railway and river way communication, which links Khulna with important regional economic centres. Taking advantage of these transport facilities, a large number of people commute to the city from surrounding regions.

• However, after completion of Padma Bridge, the economic activities at Khulna and Mongla Port will increase and effective use of existing transport infrastructure will not sufficient. The city enjoys excellent inter-city bus communication with almost all the major cities including the capital. But City Bus Transit is very old system and insufficient.
Functional Classification of Road Network

- The road network of Khulna City can be classified into the following three categories as the functional point of view:
  - Primary Road: 74.81 kilometer
  - Secondary Road: 181.94 kilometer
  - Tertiary Road: 567.72 kilometer

Total Road network: 824.47 kilometer
• Primary Road: This type of road is main circular road within the city area. More than 60 feet wide road is denotes as primary road.

• Secondary road: This type of road is connected between main roads and access road. The wide of this road varies from 40- 59 feet.

• Tertiary road: This type of road is connected between secondary roads and house connecting road. The wide of this road varies from 20- 39 feet. Another type of roads are included as tertiary road which wide is varies below 20 feet. Pedestrian & slow moving vehicle/three wheeler, bicycle is moving on this type of road.
Construction & maintenance of road, drain in KCC area
Road construction equipment, Asphalt Plant

Production capacity of Asphalt Plant is 30 ton/hr. 2500-3000 sqm. per day
Ongoing projects on road development of KCC (Funded by Central Government)

1. Project Title: Development & extension of roads, footpaths in Khulna City.
   Project Cost: BDT 742 million
   Implementation period: 2009 to June 2014
2. **Project Title**: Development of different roads & infrastructure facilities in Khulna City Corporation

**Project Cost**: BDT 2000 million

**Implementation period**: 2012 to June 2016
3. **Project Title:** City Region development Project  
**Project Cost:** BDT 4000 million (Khulna City)  
**Implementation period:** 2011 to June 2016  
**Funded by:** ADB, KFW, GOB  
**Major components:**  
**ABD funded:**  
- Excavation canals & rivers: 41 km  
- Construction of new drains: 35 km  
- Repairing of Sluice gate: 8 nos  
- Pump house: 2 nos
## List of Sub Projects financed by German Development Cooperation (KFW)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of Sub Project</th>
<th>Cost as per DPP (Million USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Improvement of Link Road 7 (Jalil Sarani, Boyra)</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Jessore Road, Bara Bazar to Joragate Area Improvement</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Rupsa River Crossing Area Improvement (Rupsha Ghat)</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Bus terminal Improvement (Rupsha Ghat)</td>
<td>0.41</td>
</tr>
<tr>
<td>5</td>
<td>Enhancement of Infrastructure for Public Transport on the Outer Bypass Road (M.A. Bari sarak)</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Access Road Improvement in Poor areas connected to the others components</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Road safety Measures (11 no. intersection area improvement)</td>
<td>0.54</td>
</tr>
<tr>
<td>8</td>
<td>Rehabilitation of Embankment / River Front Road (Labonchara main road)</td>
<td>3.25 Total 12.20</td>
</tr>
</tbody>
</table>
Khulna in Context of Climate change

According to a latest article published on *Nature Climate Change* Published on 18th August 2013, **Khulna ranked as 8th among top 20 Cities** in term of future flood losses in major coastal cities of the world.

Source: http://www.nature.com/nclimate/journal/v3/n9/fig_tab/nclimate1979_F1.html
Water logging scenario for Base Condition in 2010

Waterlogging Map for a 1–in -10 Year return Period In 2050 (Under the Scenario A2 and High Sea level Rise)

Adopted from Report on Khulna by ADB
Inundation & Water logging

- Poor Land use management specially at implementation level
- Encroachment of natural drainage and illegal occupation of canals
- Due to Climate change, without proper adaptive measures, scenarios will be more intense and prolonged.
- Will burden the corporation with more financial input for more drainage and maintainance

Salinity Intrusion and It's Threat
- Diseases will spread due to increase scarcity of potable water
- Shrimp processing industry will suffer due to reduced productivity from shrimp cultivation farm
- Threatening fragile coastal eco system
- Loss of bio diversity
- Quick erosion of structures
Figure 2  Salinity Concentration in Rivers in and around Khulna

Monthly Salinity (2005–2009) done by DOE

DOE = Department of Environment, mg/L = milligrams per liter.
Table 1  Summary Features of Climate Projections for Khulna

<table>
<thead>
<tr>
<th>Scenario</th>
<th>A2</th>
<th>B1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>The average monthly temperature rise by 2050 varies from +0.5°C in October to +1.7°C in January and February.</td>
<td>The average monthly temperature rise by 2050 varies from +0.5°C in June, July, and August to +1.5°C in February and April.</td>
</tr>
<tr>
<td>Rainfall</td>
<td>The annual rainfall increases by about 5.0% by 2050 (1,860 mm per year) from the reference period.(^a)</td>
<td>The annual rainfall increases by about 9.3% by 2050 (1,739 mm per year) from the reference period.(^b)</td>
</tr>
<tr>
<td>Seasonal rainfall</td>
<td>Increase in July–September by 4.6% and a decrease in December–February by 26.3%</td>
<td>Increase in July–September by 10.5% and a decrease in December–February by 46.2%.(^c)</td>
</tr>
<tr>
<td>Rainfall intensity</td>
<td>50 mm or more rainfall in 6 hours increases from 4.20 times per year to 5.90 times per year in 2050.</td>
<td>50 mm or more rainfall in 6 hours marginally increases from 4.20 times per year to 4.25 times per year in 2050.</td>
</tr>
</tbody>
</table>

\(^a\) The value is compared with 1,769 mm, the average annual rainfall from 2001 to 2020 projected in the model under the A2 scenario, and thus is different from the observed value (1,924 mm from 2004 to 2009) in the past. The observed value is higher than the projected value. The historical observed average between 1985 and 2009 is 1,887 mm.

\(^b\) The value is compared with 1,591 mm, the average annual rainfall from 2001 to 2020 projected in the model under the B1 scenario, a much lower figure than the observed value.

\(^c\) A higher degree of increase and decrease under the B1 scenario in comparison to that under the A2 scenario is different from what one normally expects. Due to the interannual and decadal variability and chaotic nature of atmospheric process, individual model runs can result in different changes in rainfall. Therefore, these differences are considered within the margin of error and do not necessarily mean that there will be higher variation under the B1 scenario.

Source: Adapted from ADB.
Fig: Existing Condition of the river bank erosion

Railway Slum
Some scenario of Water logging in city area
Water logging in CBD area
Slow moving vehicle in Khulna City
Proposed Projects for Khulna
## Proposal for Bus Rapid Transit route in Khulna City

<table>
<thead>
<tr>
<th>Bus route-1</th>
<th>Fultala to Daulatpur to Natun Rasta more to Boyra college more to Zoragate to Feryghat more to Khan Jahan Ali road, Rupsha Ghat to Rupsha bridge</th>
<th>18 km</th>
<th>Development of Infrastructure facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus route-2</td>
<td>Gallamary zero point to University to Gallamary to Sonaganga to Bayra bazar to Abu Naser Hospital to Natun Rasta more to BIDC road to Zoragate to Shibbari to Maylapota to Gollamary to Zero point.</td>
<td>20 km</td>
<td>Development of Infrastructure facilities</td>
</tr>
<tr>
<td>Bus route-3</td>
<td>KUET gate to City bypass to Bastuhara link road to Abu Naser hospital to Boyra bazar to Mostor more to Zero point.</td>
<td>20 km</td>
<td>Development of Infrastructure facilities</td>
</tr>
<tr>
<td>Bus route-4</td>
<td>Atra to Gallamary zero point to Rupsha bridge.</td>
<td>23 km</td>
<td>Development of Infrastructure facilities</td>
</tr>
</tbody>
</table>
Development of Infrastructure facilities

- Extension of Existing roads including separate slow moving vehicle lane: 88 km.
- Construction of Mid island, roundabout, speed barrier, bus bays, passenger shade, ticket counter
- Construction of Footpath /walk way, Foot over bridge for pedestrian (Dakbangla, Shibbari, Natun Rasta more for foot over bridge).
- Construction of over pass where separate the mode of traffic move an intersection point such as railway & road way intersect each other, this area to be developed for overpass to avoid accident & traffic jam (Zoragate, Natun Rasta more, Daulatpur bazar, Fulbarigate)
- Installation of Traffic signal & signage
- Purchase of Bus, Mini bus
- Construction of Bus terminals
Thank you