on the connectivity with these rivers and the levels of water in them at any given time of year.

The urban drainage system consists of a complex network of drains -- both open and closed. The roadside drains flow into bigger drains or sewers which in turn empty into large canals, locally known as Khal. The major drainage canals or Khals in the City are Dholai Khal, Jerani Khal, Segunbagicha Khal and Begunbari Khal. These canals collect storm water runoff and flow into the peripheral rivers. Dhaka city is protected by a flood protection embankment known as the Buckland Flood Protection Embankment. The embankment has sluice gates through which the Khals drain into the surrounding rivers.

Experts say the urban drainage network serves less than half the city. According to Wasa sources, the city has 150 square kilometers of storm drains where it needs at least 260 sq km to collect runoff from heavy showers. Many areas have no drains to speak of, and rain water simply flows overland into adjacent watercourses or into low areas, causing severe waterlogging. The city used to have many catchments or lakes (sometimes known as jheel) which held the rain water. But the Jheels have gradually been filled up to make way for construction, further aggravating the flooding.

Dhaka Water Supply and Sewerage Authority (Dwasa) are the agency responsible for managing the drainage systems of Dhaka City. In a study commissioned by Wasa in 1993, the international development consultant Mott MacDonald identified numerous deficiencies in the system. These include:

- unplanned urbanisation, expansion of the urban areas, increases in built-up areas and metal roads;
- filling of low-lying areas to construct buildings, with little or no provision for drainage.
- blockage of the main drainage systems of the urban area (khals) by unauthorised constructions;
- insufficient storm sewers constructed in the extensions to the urban area;
- lack of maintenance to the drainage system;
- lack of coordination among the different agencies engaged in the development works;
- solid waste disposal in the storm sewer.

As commuters and school going children were marooned at home or stuck on the submerged roads, the talk shows were filled with analysts who blamed various flaws in the system, and advanced sundry solutions.

Meteorologists have hastened to point out that the 333 mm rainfall in 24 hours was a once-in-50-years event, and with such a downpour, any modern city would struggle to cope. But environmentalists and urban planning experts stress that with climate change driving extreme weather patterns, Dhaka must prepare for worse flooding in the future. Through the uproar, one thing stands out: Dhaka, a mega city of 12 million, has no master plan for urban water management, and little or no coordination among different government agencies.

"Since a 2004 study by Wasa, nothing much has been done," says SM Mahbubur Rahman, Head of Water Resource Planning Division of the Institute of Water Modeling. "A World Bank study is in the pipeline. But it is vitally important to carry out a thorough study and prepare a master plan. Without it, there can be no proper coordination."

Experts say unplanned urbanisation has led to an explosion of built-up areas and accelerated the speed of rain



Open manholes and potholes are a constant menace on submerged roads.