ABSTRACT

Sustainable public transportation system is one of the important requirements of any country. In the present situation, growth of vehicles is the major problem because of accidents, congestion and pollution due to them. In future to reduce the number of private vehicles in the urban areas, more public transit especially buses are required in the developing cities. Coimbatore Corporation has been chosen for public bus transport study using integrated remote sensing and geographical information system techniques. The present research focuses on the sustainable methods to improve service levels of road transport using recent developments in the field of geospatial technologies which will help in reducing the current ad-hoc decision making in the road transport planning process.

Coimbatore Corporation has a population of 1,050,721 as per 2011 census. The mean maximum and minimum temperatures during summer and winter varies between 35°C to 18°C.

Accessibility analysis reveals that only 20 bus stops are highly accessible whereas 41 bus stops have very less accessibility and 44 bus stops are less accessible. It is suggested to take suitable action to increase the accessibility of less accessible bus stops. The kernel density estimator, point density estimator, accessibility and accident hotspot were discussed for vulnerable bus stops in the Coimbatore Corporation.

Accident analysis reveals that out of the 197 bus stops 11 bus stops within the corporation limit come under very high vulnerability whereas 58 bus stops are in high vulnerability zone for which suitable action is to be taken by the planners and decision makers to reduce the accidents in this zone. In future, suitable optimization methods can be adopted to find safe and

accessible bus stops. The kernel density estimator and point density estimation provide a detailed assessment of accessibility and accident hotspot in the Coimbatore Corporation

Ring roads will help to a great extent in improving the safety, efficiency and fast movement of both men and goods and in turn will result in increasing the economy of the city. For ring road formation the slope percentage, land use and geomorphology map were integrated using normalized weight method. The results revealed that the different buffer zones of ring road formation are particularly useful for engineering construction in Coimbatore Corporation. The different types of utilities with ring road formation show the present and future road network conditions in the study area. The physical aptness and formation of ring road buffer zone is especially important information for future engineering construction of road network in the study area.

The derived flood risks indices (UFRI) can be used for decision making towards planning for flood management. In overall, the study results show that the GIS-AHP based category model is effective in identifying flood risk zones. The results reveal that immediate action is required during rainy season to avoid traffic congestion and flood risk to maintain sustainable environment.

The urban environmental quality using environmental indicators of air pollution (SO_2, NO_2, CO, PM_{10} and $PM_{2.5}$), noise pollution density and noise along road have been generated. For social indicator, the population density, urban green space (NDVI), topography of aspect, slope and land use map were prepared and integrated using index overlay method. It is found from the pollution map that significant amount of pollution is poor to bad quality in the study area. The air quality index indicated that the significant amount of pollution is generated by the public transport. The urban eco-

friendly vehicle route map is extremely useful to user community of public transport. The air quality index estimation indicates the pollution level in the study area. The air pollution, noise pollution and different socio-economic environmental quality parameter give important information on pollution levels in the study area. It reveals that the significant part of study area is affected by pollution.

Besides the increase in vehicle population, the busy Coimbatore to Pollachi road has become more prone to fatal accidents mainly due to speeding buses. Highest percentage of accidents (72%) occurred during the time period of 09:00 to 20:59 hours. The result of traffic rate (R_t) indicate that greater than thrice of lambda and if R_t is less than one, then we say that there is high traffic.

The open source applications developed based on WebGIS will be particularly useful for the public.