

## **Innovative approaches to assess the impact of transport infrastructure investments on GDP, employment and the environment in Senegal: a systems dynamics analysis**

The Sustainable Development Goals (SDGs) include many goals related to the environment. Of the three (3) pillars of sustainable development, monitoring and evaluation of progress towards environmental sustainability is the weakest.

This document is part of the resilience of Senegal's transport sector to climate change in the sense that, although it can measure the impact of investments in transport infrastructure on GDP and employment, its main advantage is to estimate carbon emissions from transport and its main objective is to set up an assessment model based on system dynamics that makes it possible to quantify the impact of transport infrastructure investments. the impact of investments in transport infrastructure on GDP, employment and the environment. To do this, the classical approach to system dynamics of Sterman (2000) was used to facilitate modeling. To this end, the key sectors that make up the theme are considered as blocks (transport block, employment block, economy block and environment block).

At a threshold of 5%, the model designed gives fairly plausible results. Indeed, over the period from 2000 to 2017, the model estimates jobs with an error of 0.18% and GDP with an error of 3%. Several simulations were carried out and grouped into four scenarios. The first relates to a situation without TER or BRT: this is the basic scenario in relation to which the other scenarios will be interpreted, the second consists of putting oneself in an environment that is only characterised by the implementation of the TER. The third scenario refers to a situation specific only to the BRT and the last scenario corresponds to the current scenario which is a situation that takes into account both the Regional Express Train (TER) and the Bus Rapid Transit (BRT). The main conclusion is that the TER and BRT have a positive impact on employment, GDP. In addition to these scenarios, avoidance alternatives of 5%, 10% and 15% have been formulated. The results showed that with the implementation of public transport infrastructure, the higher the percentage of bypass, the greater the gains in terms of carbon emissions.