



ECONOMY AND ENVIRONMENT PROGRAM FOR SOUTHEAST ASIA

POLICY BRIEF

COLOMBO CHOKES ON THE CAR: THE CASE FOR CONTROLLING AUTOMOTIVE AIR POLLUTION

The city of Colombo is gradually being choked to death by motor traffic and urgently needs to implement a raft of economic measures to curb emissions. This is the verdict of a recent study that has attracted the attention of local policymakers. The project was carried out by an EEPSEA-supported researcher from the Department of Economics at Colombo University.

The study, by Dr. Sunil Chandrasiri, looked at the growth of traffic in the city and the impact it is having on air quality. It then analysed the feasibility and cost-effectiveness of different pollution reduction strategies. Chandrasiri's main conclusions were that new pricing policies could help bring about environmentally-friendly changes in the type of fuel used and vehicles driven. These, combined with good traffic management and inspection programmes, could go some way to solving the city's traffic pollution problems.

The research was undertaken against a background of increasing car use in the Sri Lankan capital. After economic liberalization in 1977, the number of vehicles of all types in Colombo has risen well past the 1.3 million mark, with traffic growth running at 5 per cent per annum between 1981 and 1996.

By analysing the figures for automotive vehicle growth, Chandrasiri found that, even though diesel vehicles are comparatively more expensive than petrol cars, diesel-driven vans and pickups have recorded the highest growth, along with diesel-driven three wheelers. This is the result of an equity-oriented fuel pricing structure that is heavily biased in favour of diesel users, who are assumed to have low incomes. At present a litre of petrol is four

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times more expensive than a litre of auto diesel. In fact, Sri Lanka is the only country which maintains such a high disparity between petrol and diesel. Moreover tax concessions are granted to diesel driven buses, lorries and vans.

This has meant that the stock of privately owned diesel vehicles has shown a marked increase in the 1990s. But most of these vehicles are in fact owned by individuals in the high income bracket and are used mainly for private purposes. The market's response to the pricing structure has undermined equity, while damaging the environment. Chandrasiri highlights this as an example of policy failure.

While air quality monitoring and management in Sri Lanka is still in its initial stages, the first major effort to measure air quality in Colombo has been undertaken. It was found that, except in the case of sulphur dioxide, the transport sector is now the biggest contributor to air pollution in the city.

By examining research done in the early 1990's, Chandrasiri found that petrol and diesel vehicles respectively account for 78 and 22 per cent of total emissions. Among petrol driven vehicles, cars and two-stroke motor cycles account for over half of the emissions. In per-vehicle terms, two-stroke motor cycles account for the highest share of emissions. They are 20 to 25% less fuel efficient than four-stroke motorcycles and contribute tens times as much to air pollution. Buses and lorries are the major diesel pollution culprits.

As well as the sheer number of vehicles, Chandrasiri found that another major cause of poor air quality is the nature of fuel used in Colombo. Auto diesel in Sri Lanka contains about 0.8 percent sulfur, and produces high emissions of sulphur and hydrocarbons. Petrol is manufactured with a high level of tetraethyl lead.

These automotive problems have serious health implications - in Sri Lanka, observed Total Suspended Particulate matter (TSP), SO₂, O₃ and lead levels are now significantly higher than air quality standards recommended by WHO and Sri Lanka's Central Environmental Authority (CEA). Already health studies are pointing to profound problems - for example, findings show that people who are exposed to traffic pollution have a significantly higher level of lead in their blood, with traffic policemen the worst affected. The health benefits of reducing PM₁₀ in Colombo has been estimated to be in the region of Ps. 67.448 to Rs 158.782 million per annum.

In order to devise policies to reduce pollution, Chandrasiri analysed the various factors which determine vehicle ownership and use in Colombo. He found that the impact of fuel price changes on fuel consumption would be quite low, with a 10 per cent increase in petrol prices only reducing demand by 0.78 per cent. In contrast, he found that the introduction of various technical improvements in Colombo's cars, lorries and motorcycles appears to have great potential for controlling air pollution.

By looking at the impact of different technical options, Chandrasiri found that the introduction of catalytic converters with unleaded petrol and liquified petroleum gas (LPG) would give the highest level of emissions reduction in the city. Research shows that if 30% of cars used LPG, it would reduce emissions by over 7,600 tons per annum; the reduction would be 15,372 tonnes if the usage rate increased were 60%. Other feasible technical strategies include the introduction of desulphurised fuel and the prohibition of two-stroke motorcycles.

Chandrasiri then went on to analyse the cost of the different options. He found that, in terms of cost effectiveness, restrictions on the imports of two stroke motorcycles tops the list. If these vehicles were prohibited, it would result in a reduction in pollution emissions of over 2,400 tons per annum. This would cost vehicle owners who would have to upgrade to a four-stroke bike about Rs. 51.5 million per year. In comparison, the reduction of sulphur content in fuel and the introduction of unleaded petrol would cost of Rs 221.32 and Rs.317.3 million per annum respectively.

Chandrasiri found that a number of these strategies would make economic sense for individual vehicle users. For example the economic benefits between petrol and an LPG system are large enough to encourage some owners to switch to LPG. A vehicle owner who spends Rs 5000 on petrol could recover the capital costs of such a transition within 18 months. However he also found that various fiscal and legal measures would have to be implemented to encourage the implementation of some of the other technical improvements - for example a 'pollution tax' would promote the use of desulfurised diesel, while making unleaded and leaded fuel the same price would encourage take-up of the more environmentally-friendly option. He also recommended the introduction of fiscal incentives on the import of four-stroke motorcycles as a way of minimising the possible social impact of a two-stroke ban.

Given the potential of such technical improvements, Chandrasiri's final recommendation is that their development and support should be included in a package of traffic management and pollution measurement mechanisms. Given the high rate of growth of vehicle population, poor vehicle maintenance and traffic management, slow growth of the road network and other related issues there is every possibility that ambient air quality levels in the city will further deteriorate.

Chandrasiri's study has attracted the attention of policymakers. The project's findings were presented at three seminars organized by the Ministry of Environment with staff from other government departments. Several of the study's recommendations are being considered for implementation e.g. improving the quality of fuel, making legal provisions to encourage the use of vehicles powered by liquid propane gas, and improving traffic management. Many of these measures have been advocated in other studies and by other groups; the new policies are undoubtedly a cumulative result. But this study, examining a wide range of measures and comparing the costs of each, has provided a useful framework that facilitated decision-making.

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Note: 70 Rs = 1 USD

The full text of this study is available as an EEPSEA Research Report:
Controlling Automotive Air Pollution: The Case of Colombo City - Sunil Chandrasiri

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