

## Tackling an Invisible Pollutant

### Introduction

The rapid urbanisation of the late 20th and early 21st centuries presented numerous environmental challenges to policymakers around the world. At the time of writing, about 55 percent of the world's population lived in cities—a near doubling of the urban population of 1950. With two thirds of the world projected to live in cities by 2050, policymakers had to take on the task of ensuring that urban dwellers could access the many advantages of city life while avoiding the environmental degradation that so frequently accompanied urban expansion and development.

An oft-overlooked source of environmental degradation in cities was noise pollution, which could come from traffic, industrial facilities, construction, aircraft, and various other sources. Many implicitly viewed noise pollution as less concerning than other types of pollution such as smog or hazardous waste, possibly because its adverse health effects were not necessarily immediate or visible. But the ill effects of excessive noise on health were well-documented: noise pollution was associated with hearing loss, higher cardiovascular disease risk, substantial sleep disturbance, and increased depression and anxiety. Research had also linked loud noise to hyperactivity and inattentiveness as well as poorer reading comprehension skills in children. “People forget that noise pollution is still pollution,” Kate Wagner wrote in *The Atlantic*.<sup>1</sup> “And noise pollution is everywhere.” In Singapore, a small city-state with a relatively high population density, it was difficult to avoid noise pollution entirely, as many Singaporeans lived close to road traffic or public transport lines as well as each other.

### The sound of development

Singapore's famously convenient and high-coverage public transport system, which included Mass Rapid Transit (MRT) and Light Rail Transit (LRT) lines, buses, and taxis, was a frustrating source of noise to some Singapore residents. Nadia Begum, who lived in Choa Chu Kang, told *The Straits Times* that she had to block out the noise from the MRT line near her house by putting a pillow over her head.<sup>2</sup> The noise levels at Begum's residence were 73.2 decibels when an MRT train was going past.<sup>3</sup> The World

---

<sup>1</sup> Kate Wagner, “City Noise Might Be Making You Sick,” *The Atlantic*, February 20, 2018, <https://www.theatlantic.com/technology/archive/2018/02/city-noise-might-be-making-you-sick/553385/>.

<sup>2</sup> Ng Jun Sen, “Living with noise pollution: Serangoon, Bukit Timah and Clementi among the noisiest neighbourhoods in Singapore”, *The Straits Times*, April 23, 2017, <http://www.straitstimes.com/singapore/housing/sounds-awful-cant-sleep-cant-talk-because-of-noise>.

<sup>3</sup> Ibid.

---

This case was written by Tara Thean under the guidance of Adrian Kuah, Lee Kuan Yew School of Public Policy (LKY School), National University of Singapore and has been funded by the LKY School. The case does not reflect the views of the sponsoring organisation nor is it intended to suggest correct or incorrect handling of the situation depicted. The case is not intended to serve as a primary source of data and is meant solely for class discussion.

Copyright © 2018 by the Lee Kuan Yew School of Public Policy at the National University of Singapore. All rights reserved. This publication can only be used for teaching purposes.

Health Organisation (WHO) suggested that the effects of noise levels above 55 decibels at night could cause higher risk of cardiovascular disease, low-quality sleep, annoyance, and other health issues, and recommended that outside noise levels be kept under 40 decibels at night.

The LTA began examining railway noise in 2011, measuring the noise levels of elevated MRT tracks. In 2013, the LTA announced the agency's plans to build 20 km of noise barriers along such MRT tracks by 2020. The noise barriers would reduce noise from the MRT tracks by about five to 10 decibels. At Begum's residence, this would lower noise levels to between 63 and 68 decibels, which was still higher than the WHO's recommended noise levels for avoiding sleep disturbance and the resulting harms to health. The LTA had completed over half of their noise barrier target at the time of writing, and noise measurements after the installation of these barriers showed "at least a 5dBA noise reduction of passing train measured at the residential buildings adjacent to these tracks," according to Sim Siang Boon of the LTA. Apart from the noise barriers, the LTA also explored other means for controlling train noise such as noise-absorbing "sleepers" on the tracks and wheels that could dampen noise.

Some feedback suggested that the noise barriers may not have had their desired effect. Tan Liak Eng, who also lived in Choa Chu Kang, told *The Straits Times* that he did not feel that the barriers had significantly improved the noise levels near his residence, and that he was still hearing loud noise from the MRT near midnight.<sup>4</sup> LTA Chief Executive Chew Hock Yong noted that some noise was inevitable. "There will be some degree of rail noise in a densely-built environment like ours where the MRT was designed to serve residents along high-density corridors," he said in 2011.<sup>5</sup>

Meanwhile, the National Environment Agency controlled construction noise using a set of permissible noise limits at specific hours. The highest noise level allowed near residential buildings that were less than 150m from a construction site, for example, was 75 dBA over a continuous period of 12 hours during the day; that allowed near hospitals and schools was 60 dBA over the same time period. Noise sources that roughly corresponded to these noise levels included the noise of a sewing machine (60dB), a vacuum cleaner (70dB), and a dishwasher (75dB).<sup>67</sup> Construction sites that were less than 150m away from residential areas were not permitted to operate on Sundays and public holidays.

---

<sup>4</sup> The Straits Times, Noise barriers and no-work Sundays among measures taken, *The Straits Times*, April 23, 2017, <http://www.straitstimes.com/singapore/housing/noise-barriers-and-no-work-sundays-among-measures-taken>.

<sup>5</sup> Land Transport Authority, "LTA Unveils Plans to Look Into Mitigating Railway Noise," press release, June 14, 2011, <https://www.lta.gov.sg/apps/news/page.aspx?c=2&id=62r6e6fhkc7qx00h4a5vkq1f295du0fd2fgz17uup8yhlt5jh4>.

<sup>6</sup> The Washington Post, "Common Sounds and Their Approximate Db Levels", *The Washington Post*, March 10, 2009, <http://www.washingtonpost.com/wp-dyn/content/article/2009/03/09/AR2009030902133.html>.

<sup>7</sup> "I Love What I Hear! Common Sounds", National Institute on Deafness and Other Communication Disorders, accessed June 28, 2018, <https://nidcdstg.nidcd.nih.gov/health/i-love-what-i-hear-common-sounds>.

Other sources of noise in public places included marketing and advertising. Karen Flynn expressed her dissatisfaction with noisy advertising practices along Orchard Road, an iconic Singaporean shopping street, in the *Singapore Business Review*:

“Who in their right mind would stand next to a speaker that is pumping 105dB of pop music to listen to an uninspiring promoter shout a poorly-crafted sales pitch to their ear? Is it time that marketers take a serious look at these “marketing” events in public spaces?

Frankly, I align it closely to inhaling toxic cigarette smoke or smelly body odour as I stroll along a nice pavilion looking to enjoy retail therapy—instead of adding to the enjoyment of one's shopping experience, it simply grates on the senses and causes annoyance.”<sup>8</sup>

Cities such as Ho Chi Minh City in Vietnam also suffered from noise related to advertising, with shops and restaurants often playing very loud music from speakers to draw attention to their services. Adding to this noise in Ho Chi Minh City was loud traffic noise that had an “impulsive, percussive character”, according to a 2010 study, with much of the noise coming from motorcyclists blowing their motorcycle horns with great frequency.<sup>9</sup> The study suggested that cities located in developing countries may experience more traffic noise than those in developed countries. Vietnam had put in place noise level limits, but measurements taken in Ho Chi Minh City and Hanoi demonstrated that noise levels exceeded these standards considerably, especially in industrial areas.

## Neighbour relations

For Singapore's residents, living in relatively close proximity to other people was almost unavoidable. Singapore was small and dense, with a 719 km<sup>2</sup> land mass and 5.6 million population at the time of writing. Over 80 percent of residents lived in public HDB flats that were built to optimize space usage.

With such a small amount of space between people, it was not difficult for noise from an individual residence to waft into someone else's flat. Nearly three quarters of neighbour disputes that the Singapore State Courts heard from October 2015 to July 2016 were related to noise complaints such as loud karaoke machines, dogs, or loud family disputes. Religious celebrations or other events such as funerals or weddings held at the void decks of HDB flats could also create unwanted noise. Audio engineer C. Eswaran saw neighbour noise as a problem serious enough to warrant creating a noise recording service provider called Noise Busters Singapore, which provided noise measurement and analysis services that residents could use as evidence in noise-related disputes.

---

<sup>8</sup> Karen Flynn, “When Singapore marketing becomes annoying noise pollution,” *Singapore Business Review*, February 14, 2013, <http://sbr.com.sg/media-marketing/commentary/when-singapore-marketing-becomes-annoying-noise-pollution>.

<sup>9</sup> Hai Yen Thi Phan, “Characteristics of road traffic noise in Hanoi and Ho Chi Minh City, Vietnam,” *Applied Acoustics* 71, no. 5 (2010): 479-485.

The Miscellaneous Offences (Public Order and Nuisance) Act (Chapter 184) put forth the following regulations to manage noise:

“(1) Any person who makes any noise by any instrument or other means in such a manner as to cause or be likely to cause annoyance or inconvenience to the occupier of any premises in the vicinity or to any person lawfully using any public road or in any public place shall be guilty of an offence and shall be liable on conviction to a fine not exceeding \$1,000.

(2) Any police officer, on any complaint that any person in any premises or in any public place is making such noise as to cause annoyance or inconvenience to the complainant, may enter upon the premises or proceed to the public place and, after warning the person reasonably suspected of making the noise, stop the making of such noise whether by the removal of any instrument or object or in some other appropriate manner.”

Residents were encouraged to resolve noise issues using means other than going to court. For example, the Ministry of Culture, Community and Youth (MCCY) encouraged “building *kampong* spirit”—that is, building a neighbourly, collaborative living environment—by talking with neighbours in a calm, polite, and friendly manner and avoiding angry outbursts.<sup>10</sup> If this approach wasn't effective, residents could turn to community leaders or use mediation services at the Community Mediation Centre (CMC), which provided trained volunteer mediators who would informally facilitate a conversation between parties to help find a solution that worked for everyone. Both grassroots leaders and the CMC aimed to provide a neutral third party who could help with dispute resolution and provide unbiased advice. While the CMC achieved a 75 percent success rate in resolving neighbour conflicts, the voluntary nature of the CMC meant that disputing parties did not turn up to mediation sessions more than half the time. Further, the center did not have the authority to intervene if the involved parties could not resolve their issues.

If individuals chose to take a noise case to court, they could file a case with the Community Disputes Resolution Tribunal (CDRTs). The CDRTs were the part of the State Courts that dealt with cases under the Community Disputes Resolution Act, whose purpose was to ensure that “no person should cause unreasonable interference with his neighbour’s enjoyment or use of that neighbour’s place of residence”.<sup>11</sup> Upon the provision of sufficient evidence, the CDRT could issue court orders to the offending neighbour, such as an order to cease the noise-generating activity. The MCCY noted, however, that residents should only turn to the CDRTs after exhausting other options, as other steps such as informal discussions between residents and their neighbours about a given issue could help “preserve neighbour relations.”<sup>12</sup>

---

<sup>10</sup> “Guidelines for resolving disputes between neighbours,” Ministry of Culture, Community and Youth, accessed June 28, 2018,

[https://www.mccy.gov.sg/Topics/Community/Articles/Resolving\\_Neighbourly\\_Disputes.aspx](https://www.mccy.gov.sg/Topics/Community/Articles/Resolving_Neighbourly_Disputes.aspx).

<sup>11</sup> “An Overview of the CDRT,” Singapore State Courts, June 28, 2018,

<https://www.statecourts.gov.sg/CDRT/Pages/CDRT-Process.aspx>.

<sup>12</sup> “Guidelines for resolving disputes between neighbours.”

## In the eye of the beholder

Whether particular noise sources qualified as “noise pollution”, and what actions were appropriate to tackle them, was sometimes a contentious issue. In early 2017, the Singaporean football academy JSSL Singapore had to stop conducting weekend football practice sessions on the facilities of the Home United Youth Football Academy (HYFA)—one of Singapore's top youth football facilities, according to *Today*<sup>13</sup>—because of noise complaints. Residents of the nearby HDB Block 126 said that the noise from HYFA's football pitches was extremely disruptive.

“The shouting never stops. The constant noise has been so disruptive. My son, who was taking his A levels last year, had to shut all his windows to study,” Alan Hoong told *The Straits Times*.<sup>14</sup> In a different interview, Hoong likened the noise to “living inside a football stadium”.<sup>15</sup> Following residents' complaints to various government agencies, the Singapore Land Authority (SLA) delivered an injunction that made two of HYFA's 11-a-side football pitches off-limits during the weekends as well as after 7pm on weekdays.

Some parties did not take kindly to the decision. JSSL Singapore managing director Harvey Davis said the injunction showed a disregard for the many youths who played football on the fields as well as JSSL Singapore's business, which experienced increased costs due to having to relocate football sessions.<sup>16</sup> He also emphasized that the noise complaints had come from only four or five residents. Meanwhile, author Neil Humphreys described the move as detrimental to Singapore's nascent sports culture and suggested that the focus on the less desirable facets of football—“It's loud, excessive, physical, sweaty, sometimes involves swearing and occasionally gets ugly,” he wrote<sup>17</sup>—at the expense of the sport's many positives was misplaced.

Buskers were another source of conflict for many cities around the world. Public appreciation for buskers—people who performed music, dance, or other things in public, often with the hope of attracting monetary donations from passers-by—varied tremendously: buskers could find themselves surrounded by a crowd clapping enthusiastically along with their saxophone solo, or completely ignored. The quality of performances did not necessarily influence their reception. Only seven people out of the 1,097 who walked past the Grammy Award-winning violinist Joshua Bell playing the violin outside a Washington, D.C. subway station stopped to listen to the music, and Bell earned US\$32. In Edinburgh, Scotland, noise complaints related to busking

---

<sup>13</sup> Noah Tan and Teo Teng Kiat, “SLA serves Home United's youth academy injunction on pitch usage,” *Today*, January 13, 2017, <http://www.todayonline.com/sports/sla-serves-home-uniteds-youth-academy-injunction-pitch-usage>.

<sup>14</sup> Alvin Chia, “Football: In need of sound compromise,” *The Straits Times*, January 15, 2017, <http://www.straitstimes.com/sport/football/in-need-of-a-sound-compromise>.

<sup>15</sup> Shamir Osman, “Residents launch petition over Home United Youth Academy noise,” *The New Paper*, June 10, 2016, <http://www.tnp.sg/sports/singapore-football/residents-launch-petition-over-home-united-youth-academy-noise>.

<sup>16</sup> Tan and Teo, “SLA serves Home United's youth academy injunction.”

<sup>17</sup> Neil Humphreys, “Singapore can't pretend to have a sports culture if kids can't play,” *FourFourTwo*, January 17, 2017, <https://www.fourfourtwo.com/sg/features/singapore-cant-pretend-have-a-sports-culture-if-kids-cant-play#b34V2wdPb7PzOPD.99>.

were some of the most frequent complaints from the city's residents.<sup>18</sup> But busking also helped imbue Edinburgh with character and vibrancy, convener of the City Centre Neighbourhood Partnership David Beckett said.

Singapore put in place its Busking Scheme in 1997. Under the scheme, aspiring buskers had to attain a Busking Card by audition "to ensure consistency in the quality of busking activities".<sup>19</sup> Auditionees had to demonstrate their proposed busking acts in five minutes, and had to fulfil several criteria to pass the audition: "competency and skill in performance", "expression and confidence in performance", "engagement with the audience", and "innovation and originality".<sup>20</sup> The National Arts Council had established specific locations in Singapore where busking was permitted, and buskers had to adhere to guidelines such as avoiding the use of non-battery-operated amplifiers or blocking traffic.

Other cities also offered guidelines on acceptable busking behaviour. In Edinburgh, for example, buskers were asked to perform at a reasonable volume level and avoid staying at the same spot for over an hour. The guidelines also suggested that buskers stop their activities if a person found their busking an inconvenience and asked them not to continue,<sup>21</sup> and buskers were generally not allowed to use amplifiers.

In 2014, Tang Fook Meng wrote in *Today* that buskers' performances in Singaporean hawker centres made his meals and conversations a more stressful experience. "Train platforms are already crowded and noisy. Do we need more noise and buskers taking up needed space?" he wrote.<sup>22</sup> Other buskers enjoyed significant crowd appreciation, however. In 2017, 10-year-old Alan Fong told *The Straits Times* that he earned about \$100 for each hour-and-a-half long busking session in Chinatown, along with gifts such as flowers and even beer.

Some felt that Singapore had become noisier in recent years.<sup>23</sup> Though the government had taken measures such as erecting MRT noise barriers and establishing regulations on construction noise levels, it was not clear to residents that such actions would be an adequate defence against the noise pollution that might accompany the country's development. There were only going to be more MRT lines and new buildings. The LTA planned to expand Singapore's rail network from 200 km to 360km by 2030 so that most of the country's households could access a train station within 10 minutes---a move aimed at making public transport more convenient and, in the bigger picture, decreasing Singapore's reliance on cars and thus make the country more sustainable in the area of transportation.

---

<sup>18</sup> "Buskers 'Hit the Right Note' in new awareness campaign," The City of Edinburgh Council, accessed June 28, 2018, <http://www.edinburgh.gov.uk/news/article/553/buskers-hit-the-right-note-in-new-awareness-campaign>.

<sup>19</sup> "Busking," Singapore National Arts Council, accessed June 28, 2018, <https://www.nac.gov.sg/whatwedo/engagement/artsforall/busking.html>.

<sup>20</sup> Ibid.

<sup>21</sup> "Buskers 'Hit the Right Note' in new awareness campaign."

<sup>22</sup> Tan Fook Meng, "Buskers add to noise, crowd in train stations," *Today*, July 14, 2014, <http://www.todayonline.com/voices/buskers-add-noise-crowd-train-stations>.

<sup>23</sup> Ng Jun Sen, "Living with noise pollution."

Many other cities experienced loud environmental noise as well. A fifth of Vietnam's working population experienced excessive noise on a regular basis,<sup>24</sup> and parts of London's underground rail system were louder than a helicopter's takeoff.<sup>25</sup> New York City had fought a long battle against noise pollution: measures from eras past included putting rubber soles on horses, former mayor Fiorello Henry La Guardia's 1935 campaign for "noiseless nights", and the "Don't Honk" signs of 2013.<sup>26</sup><sup>27</sup> "In 2013, the city's Transportation Department began removing the "Don't Honk" signs, which were often ignored."<sup>29</sup>

"The noise has won every battle," Emily S. Rueb wrote.<sup>30</sup> "Today, many believe the city is the loudest it has ever been."

The noisiest city in a study of 50 cities at the time of writing was Guangzhou, China, followed by Delhi, India, and Cairo, Egypt; the quietest cities were Zurich, Vienna, and Oslo.<sup>31</sup> Singapore was somewhere in the middle. City dwellers could not easily escape from the discomfort and ill health effects of environmental noise to which they were involuntarily exposed, and the ill health effects of environmental noise were less well advertised and understood than those of air or water pollution. Noise was also financially costly, contributing to hearing loss that cost an estimated US\$750 billion every year globally due to costs such as those in the health sector as well as productivity losses.<sup>32</sup>

Some actions had proven to be effective for tackling noise pollution. The inaugural car-free day in Paris, France led to certain parts of the city experiencing a halving of their usual noise levels, for example. Other initiatives were citizen-led, with researchers developing smartphone applications that enabled users to measure and report sound levels in different parts of the city to better inform city planners of noisy hotspots. Acoustics experts emphasised the importance of tackling noise through city planning with the long term in mind, as the effects of prolonged exposure to loud environmental noise tended to add up.

---

<sup>24</sup> Vi Vu, "15 million people being drowned out by noise pollution in Vietnam: study," *VnExpress International*, July 21, 2017, <https://e.vnexpress.net/news/news/15-million-people-being-drowned-out-by-noise-pollution-in-vietnam-study-3616666.html>.

<sup>25</sup> Gareth Furby, "London Underground noise could damage hearing, says academic," *BBC News*, January 29, 2018, <https://www.bbc.com/news/uk-england-london-42791299>.

<sup>26</sup> Emily S. Rueb, "New York's War on Noise," *The New York Times*, July 12, 2013, [www.nytimes.com/interactive/2013/07/13/nyregion/nyc-noise-timeline.html/#time228\\_7605](http://www.nytimes.com/interactive/2013/07/13/nyregion/nyc-noise-timeline.html/#time228_7605).

<sup>27</sup> Matt Flegenheimer, "Stop the Honking? New York Suggests It's a Lost Cause," *The New York Times*, January 28, 2013, <http://www.nytimes.com/2013/01/29/nyregion/new-york-removes-no-honking-signs.html>.

<sup>28</sup> Emily S. Rueb, "Many Pleas for Quiet, but City Still Thunders," *The New York Times*, July 12, 2013, <http://www.nytimes.com/2013/07/13/nyregion/many-pleas-for-quiet-but-city-still-thunders.html>.

<sup>29</sup> Flegenheimer, "Stop the Honking? New York Suggests It's a Lost Cause."

<sup>30</sup> Rueb, "Many Pleas for Quiet."

<sup>31</sup> Alex Gray, "These are the cities with the worst noise pollution," *World Economic Forum*, March 27, 2017, <https://www.weforum.org/agenda/2017/03/these-are-the-cities-with-the-worst-noise-pollution/>.

<sup>32</sup> "Deafness and hearing loss," World Health Organization, accessed June 28, 2018 <http://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss>.

### Discussion questions

1. Should Singapore prioritize lowering environmental noise, or protecting residents from environmental noise, in formulating development plans or environmental policy? Why or why not?
2. What metrics would you use to quantify the cost to society of noise pollution in Singapore? How would you include noise pollution in a cost-benefit analysis of a development project?
3. Noise pollution is rarely viewed as seriously as other types of pollution. Why might this be the case? Is it different from other types of pollution?
4. What are some options for tackling noise that may be seen as “pollution” by some, but as welcome noise by others? For example, some may view loud rock music emanating from a stadium as a disturbance to the peace of their homes, while others may view it as free and welcome entertainment.
5. To what extent can “consideration for others” with regards to noise be regulated/enforced?