# Singapore's heat resilience efforts expand in response to rising temperatures and regional challenges



Years of record-breaking temperatures and escalating heatwaves have thrust the issue of heat stress to the forefront of public health and environmental policy, particularly in equatorial regions like Singapore and Southeast Asia. Addressing this, Associate Professor Jason Lee, director of the National University of Singapore’s Heat Resilience and Performance Centre (HRPC), is broadening his research scope to focus on helping vulnerable populations cope with the intensifying heat. His work aligns with the Singapore Government’s efforts, which include the rollout of a national heat advisory and heatwave response plans designed to mitigate heat-related health risks across multiple sectors.

Singapore’s climate presents a unique challenge, marked by the perilous combination of high humidity and soaring temperatures, which impairs the body’s natural cooling process through sweat evaporation. Prof Lee emphasises that while air-conditioning has greatly enhanced comfort and safety, its widespread use poses environmental sustainability concerns. Hence, he advocates for more sustainable cooling solutions such as fan-assisted ventilation, especially targeted at vulnerable groups like outdoor workers, platform delivery riders, children, and hospital patients in non-air-conditioned wards.

Project HeatSafe, led by Prof Lee and collaborating NUS researchers, underpins much of this work by investigating the health and productivity impacts of heat in Singapore and the wider region. Their studies reveal significant heat stress exposure at outdoor worksites, deterioration in productivity, and serious health consequences including reduced fertility and complications during pregnancy. These findings underscore the broad socioeconomic impacts of rising heat and the urgent need for adaptive measures.

Singapore’s Ministry of Sustainability and the Environment (MSE), alongside the National Environment Agency (NEA), has launched a Heat Stress Advisory system accessible via the myENV app and NEA’s website. This system furnishes real-time heat stress level updates—low, moderate, or high—based on the Wet Bulb Globe Temperature (WBGT), guiding the public on activity adjustments and protective actions to mitigate heat-related illnesses. This initiative complements Prof Lee’s work by providing practical, accessible tools to help people adjust their behaviours in response to immediate heat risks.

Meteorological data confirms the mounting challenge: 2023 was Singapore’s fourth-warmest year on record, with May tying as the hottest month ever documented. On one occasion, temperatures hit 37°C, the highest since 1983. Furthermore, there were 37 days last year during which heat stress levels reached or exceeded a WBGT of 33°C, indicating considerable recurrent exposure for the population and particularly those engaged in outdoor labour. Such trends signal the critical importance of preparing vulnerable groups for increasing heat stress incidents in the near future.

Beyond local studies, the HRPC has gained a pivotal regional mandate. In December 2023, it was designated the Southeast Asia hub for the UN-backed Global Heat Health Information Network (GHHIN). This role positions the centre to coordinate knowledge exchange, assess national heatwave warning systems, and help build resilience across Southeast Asian nations. Prof Lee aspires to enhance warning systems globally by personalising heat advisories through technology that accounts for individual location, attire, and physiological factors, thus offering more tailored protection.

Heat risks are exacerbated during concurrent disasters. Following the devastating 7.7-magnitude earthquake in Myanmar that overlapped with the region’s hot season, displaced populations faced extreme heat in temporary shelters. Prof Lee remotely advised disaster relief personnel on rapid hydration and other heat stress prevention measures for victims and first responders, highlighting the necessity of integrating heat management into broader emergency responses.

Prof Lee also explores innovative solutions to protect at-risk workers, particularly platform delivery riders who often extend their working hours despite rising temperatures, risking heat injuries. One promising concept is parametric insurance, which triggers payouts based on environmental thresholds such as temperature, providing financial incentives to limit work during dangerous heat. Additionally, the development of naturally cooling fabrics embedded with nanomaterials could transform daily comfort by creating a dry micro-environment around the skin, reducing heat stress even in humid conditions.

This comprehensive approach—from cutting-edge research and policy advising to technological innovation and regional collaboration—illustrates the multifaceted efforts required to tackle the growing heat crisis. As climate trends continue upward, expanding these strategies will be imperative to protect vulnerable populations and sustain productivity and health in Singapore and the broader Southeast Asian region.

### 📌 Reference Map:

* Paragraph 1 – [[1]](https://www.straitstimes.com/singapore/environment/nus-scientist-wants-to-expand-research-to-help-vulnerable-groups-in-spore-se-asia-beat-the-heat), [[4]](https://medicine.nus.edu.sg/news/heat-stress-causes-lower-fertility-productivity-and-reduced-cognitive-capacity-project-heatsafe/)
* Paragraph 2 – [[1]](https://www.straitstimes.com/singapore/environment/nus-scientist-wants-to-expand-research-to-help-vulnerable-groups-in-spore-se-asia-beat-the-heat)
* Paragraph 3 – [[1]](https://www.straitstimes.com/singapore/environment/nus-scientist-wants-to-expand-research-to-help-vulnerable-groups-in-spore-se-asia-beat-the-heat), [[4]](https://medicine.nus.edu.sg/news/heat-stress-causes-lower-fertility-productivity-and-reduced-cognitive-capacity-project-heatsafe/)
* Paragraph 4 – [[2]](https://www.mse.gov.sg/resource-room/category/2023-07-24-press-release-heat-stress-advisory), [[6]](https://www.straitstimes.com/singapore/environment/national-heat-stress-advisory-launched-as-world-hots-up)
* Paragraph 5 – [[3]](https://www.channelnewsasia.com/singapore/met-service-nea-2023-fourth-warmest-year-record-report-4065211), [[7]](https://www.channelnewsasia.com/singapore/record-hot-temperatures-unusual-monsoon-surges-singapore-2023-climate-report-takeaway-4216881)
* Paragraph 6 – [[1]](https://www.straitstimes.com/singapore/environment/nus-scientist-wants-to-expand-research-to-help-vulnerable-groups-in-spore-se-asia-beat-the-heat), [[5]](https://medicine.nus.edu.sg/news/nus-medicines-heat-resilience-and-performance-centre-to-lead-southeast-asias-efforts-in-heat-health-and-productivity/)
* Paragraph 7 – [[1]](https://www.straitstimes.com/singapore/environment/nus-scientist-wants-to-expand-research-to-help-vulnerable-groups-in-spore-se-asia-beat-the-heat)
* Paragraph 8 – [[1]](https://www.straitstimes.com/singapore/environment/nus-scientist-wants-to-expand-research-to-help-vulnerable-groups-in-spore-se-asia-beat-the-heat)
* Paragraph 9 – [[1]](https://www.straitstimes.com/singapore/environment/nus-scientist-wants-to-expand-research-to-help-vulnerable-groups-in-spore-se-asia-beat-the-heat)

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## Bibliography

1. <https://www.straitstimes.com/singapore/environment/nus-scientist-wants-to-expand-research-to-help-vulnerable-groups-in-spore-se-asia-beat-the-heat> - Please view link - unable to able to access data
2. <https://www.mse.gov.sg/resource-room/category/2023-07-24-press-release-heat-stress-advisory> - In July 2023, Singapore's Ministry of Sustainability and the Environment (MSE) and the National Environment Agency (NEA) launched a Heat Stress Advisory to guide the public in minimising heat-related illnesses. The advisory, accessible via the myENV app and the NEA's website, provides real-time information on heat stress levels—low, moderate, and high—based on the Wet Bulb Globe Temperature (WBGT). It offers recommendations for adjusting activities, taking protective actions, and wearing appropriate attire depending on the prevailing heat stress levels. The initiative aims to help Singaporeans adapt to rising temperatures and reduce the risk of heat stress during prolonged outdoor activities. ([mse.gov.sg](https://www.mse.gov.sg/resource-room/category/2023-07-24-press-release-heat-stress-advisory?utm_source=openai))
3. <https://www.channelnewsasia.com/singapore/met-service-nea-2023-fourth-warmest-year-record-report-4065211> - In 2023, Singapore experienced its fourth-warmest year on record, with a mean daily maximum temperature of 31.9°C and a mean minimum temperature of 25.7°C. May 2023 was particularly notable, tying with March 1998 as the warmest month on record, with a mean temperature of 29.5°C. On May 13, the temperature reached 37°C in Ang Mo Kio, matching the highest daily maximum temperature recorded in Singapore since 1983. These trends highlight the escalating challenges posed by rising temperatures in the region. ([channelnewsasia.com](https://www.channelnewsasia.com/singapore/met-service-nea-2023-fourth-warmest-year-record-report-4065211?utm_source=openai))
4. <https://medicine.nus.edu.sg/news/heat-stress-causes-lower-fertility-productivity-and-reduced-cognitive-capacity-project-heatsafe/> - Project HeatSafe, led by Associate Professor Jason Lee from the National University of Singapore's Heat Resilience and Performance Centre, investigates the impact of rising heat levels on health, productivity, and well-being. The study found that heat stress adversely affects decision-making, cognitive capacities, and productivity, and can lead to health issues such as reduced fertility and pregnancy complications. The research underscores the broader economic implications of heat stress, highlighting the need for effective strategies to mitigate its effects. ([medicine.nus.edu.sg](https://medicine.nus.edu.sg/news/heat-stress-causes-lower-fertility-productivity-and-reduced-cognitive-capacity-project-heatsafe/?utm_source=openai))
5. <https://medicine.nus.edu.sg/news/nus-medicines-heat-resilience-and-performance-centre-to-lead-southeast-asias-efforts-in-heat-health-and-productivity/> - In December 2023, the National University of Singapore's Heat Resilience and Performance Centre (HRPC) was appointed as the Southeast Asia node of the Global Heat Health Information Network (GHHIN). This appointment enables the HRPC to coordinate regional efforts in heat health and productivity, fostering collaborations and knowledge-sharing on issues related to heat and health. The centre aims to lead in identifying knowledge gaps, reviewing preparedness efforts, and implementing actionable strategies to enhance heat resilience in Southeast Asia. ([medicine.nus.edu.sg](https://medicine.nus.edu.sg/news/nus-medicines-heat-resilience-and-performance-centre-to-lead-southeast-asias-efforts-in-heat-health-and-productivity/?utm_source=openai))
6. <https://www.straitstimes.com/singapore/environment/national-heat-stress-advisory-launched-as-world-hots-up> - Singapore has introduced a national heat stress advisory to help the public manage heat health during prolonged outdoor activities. The advisory, available on the myENV app and the Meteorological Service Singapore's website, provides real-time information on heat stress levels—low, moderate, and high—based on the Wet Bulb Globe Temperature (WBGT). It offers guidance on adjusting activities, taking protective measures, and wearing appropriate attire according to the prevailing heat stress levels. This initiative aims to raise awareness about the dangers of heat stress and promote proactive measures to mitigate its impact. ([straitstimes.com](https://www.straitstimes.com/singapore/environment/national-heat-stress-advisory-launched-as-world-hots-up?utm_source=openai))
7. <https://www.channelnewsasia.com/singapore/record-hot-temperatures-unusual-monsoon-surges-singapore-2023-climate-report-takeaway-4216881> - In 2023, Singapore experienced 37 days of high heat stress, defined as when the hourly average Wet-Bulb Globe Temperature (WBGT) hits 33 degrees Celsius or higher. These occurrences were most frequent in April, May, June, and October, with May recording the highest number of high heat stress days. Projections indicate a significant increase in high heat stress days in the coming decades, highlighting the escalating challenges posed by rising temperatures in the region. ([channelnewsasia.com](https://www.channelnewsasia.com/singapore/record-hot-temperatures-unusual-monsoon-surges-singapore-2023-climate-report-takeaway-4216881?utm_source=openai))