

Marcel Jäggi

# Breathless: Making Build- F ings

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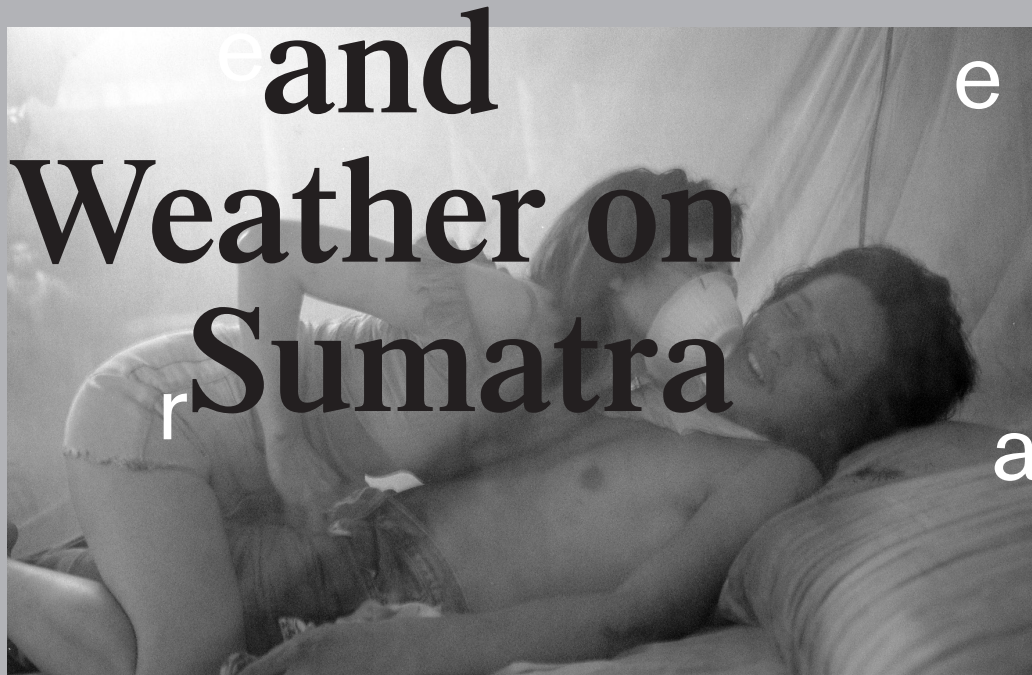


Fig. 1: Chyi and Hsiao-  
Film still from I Don't Want to Sleep Alone by Tsai Ming-  
Liang, 2006. Photo by William Laxton.

“Who told the wind to blow towards your country?”

Tucked away in an abandoned construction site, two stranded souls, the Chinese drifter Hsiao-kang and his girlfriend, the servant-waitress Chyi, are about to kiss. The cheap plastic noodle bowls and bags wrapped around their faces do not make this an easy endeavour, but the alleged protection these makeshift breathing masks offer is indispensable in a city inundated by the smoke from nearby Sumatran plantation fires. Malaysian-born director Tsai Ming-Liang sets his silent, surreal drama I Don't Want to Sleep Alone in the sparsely lit smoky alleyways of Kuala Lumpur, where the occasional curious butterfly strays through the smoke.<sup>1</sup> The above film sequence serves as an illustration of the uncomfortable climate that large segments of tropical Asia's urban population experience.

This essay is based on fieldwork carried out in the Sumatran city of Medan, in the summer of 2014 as part of the “Man-made Weather” research project by Future Cities Laboratory Singapore and the Department of Architecture, ETH Zurich. It concerns some of the manifold feedback loops (e.g. between human behaviour, buildings, city, territory, and between interior and exterior climates) that are involved in the “making” of man-made weather in the region. It investigates the nuanced interplay between culture, climate, and construction in the urban Global South. Conventional climate discourse in architecture and urbanism continues to correlate outdoor climate with nature, and indoor climate with culture. In Medan, however, climate has become a hybrid of nature and culture; climate and weather are no longer variables independent of humankind.<sup>2</sup> This spatial and climatic dependence is a result of the “race to the bottom” of urban development in Sumatra. To better understand these links between climate, buildings, and regional political ecology, it is necessary to follow a thread through different spatial scales. This essay is an attempt to explore aspects of a climate dilemma triggered by rapid economic development and people's desire for better living conditions.

### Blame the Wind? Trans-Boundary Human-Made Weather

Air emissions from industrial production and motor vehicles are

<sup>1</sup> I Don't Want to Sleep Alone, directed by Ming-Liang Tsai (2006, Homegreen Films).

<sup>2</sup> Sascha Roesler, “Man-made Weather: Natural Ventilation as Cultural Heritage of Southeast Asia” (lecture at Architecture and Urban Design, Urban Mutations on the Edge Seminar, ETH Zurich, 24 February 2014).



Figure 2: Chyi, Hsiao-kang and Rawang (from left to right) in front of a shop in Kuala Lumpur during the haze. Film still from *I Don't Want to Sleep Alone*, directed by Ming-Liang Tsai, 2006. Photo by William Laxton.

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the key sources of air pollution in Southeast Asia. Cross-border smoke from forest fires in the region (namely Sumatra and Borneo) is another major problem that impacts air quality and escalates the greenhouse effect. From May to October, when the prevailing winds of the Southwest Monsoon carry smoke over long distances, the arrival of haze in cities has become a regular occurrence.<sup>3</sup>

In June 2013, large parts of Southeast Asia were shrouded in a cloud of record-breaking air pollution. In Singapore, the haze exceeded the hazardous limit for air quality by almost three times. For a few days, the grey mist—beautiful but toxic—obscured the skyline and softened the light. As in Tsai Ming-liang's film, the most affected areas in the region resembled a post-apocalyptic scene, as those who stayed in the city only ventured outdoors with face-masks (from the highly effective NIOSH-approved N95 Particulate Filtering Facepiece to cheap plastic bags). Public institutions closed, businesses suspended work, airports withdrew service, cultural events were cancelled,

3 "About Haze," National Environment Agency (NEA), Singapore, [www.haze.gov.sg/about-haze](http://www.haze.gov.sg/about-haze).

tourists steered clear, and medical facilities faced a wave of patients suffering from respiratory illnesses.<sup>4</sup>

There were a total of 3,270 confirmed fire hotspots in June 2013, most of which were concentrated in the Riau province on the east coast of Sumatra, largely caused by slash-and-burn land-clearing practices for profit-driven agricultural uses.<sup>5</sup> A major part of this land belongs to Malaysian- and Singaporean-owned palm-oil conglomerates, creating circumstances that have led to mutual allegations of blame between Indonesia and its neighbouring countries. At its peak, an Indonesian group hacked the websites of Singaporean companies, leaving the following message: “Don’t insult our country [Indonesia] for the haze in your country [Singapore]. Don’t blame Indonesia just because the air in your country is polluted. Blame the wind. Who told the wind to blow towards your country?”<sup>6</sup>

### Ecologies of Change: Transformation of Sumatran Territories and Building Industries

The two dominant trends of changing land-use in Riau province are: 1) the development of plantation forestry for the pulp and paper industry, and 2) the expansion of palm-oil plantations. The province is Indonesia’s most productive palm-oil producer, accounting for one-sixth of the country’s total annual production.<sup>7</sup> The “nearly anonymous and mostly unseen” transformation of natural territories into “productive forests” or “landscapes inhabited by the oil palm”<sup>8</sup> has its cultural and spatial nucleus in the so-called “plantation belt,” the hinterlands around Medan, formerly used for the cultivation of tobacco and rubber but now predominantly for palm oil. First exploited under Dutch colonial rule, the region surrounding Sumatra’s largest city and its industrial capital has become “the site of one of the most intensive and successful pursuits of foreign agriculture enterprise of any developing country.”<sup>9</sup>

The spatial extension of the plantation belt into something that looks more and more like a plantation carpet covering the entire Sumatran lowlands has helped trigger the disappearance of domestic trees such as *jati*, *damar*, *nyatoh*, *merbau*, and *meranti*.<sup>10</sup> As a result, the shortage of affordable quality timber has created a highly competitive niche market in secondhand

4 Nelly Stratieva, “The ‘Burning’ Problem of Air Pollution in Southeast Asia,” Worldwatch Institute, 1 March 2014, [www.worldwatch-europe.org/node/232](http://www.worldwatch-europe.org/node/232).

5 Andree Ekadinata et al., “Replication Data For Hot Spots in Riau, Haze in Singapore: The June 2013 Event Analyzed,” World Agroforestry Centre, 2013.

6 Amelia Teng, “3 Websites Defaced with Haze Message,” [The Straits Times](http://TheStraitsTimes.com), 28 June 2013, [www.straitstimes.com/the-big-story/asia-report/indonesia/story/3-websites-defaced-haze-message-20130628](http://www.straitstimes.com/the-big-story/asia-report/indonesia/story/3-websites-defaced-haze-message-20130628).

7 Krystof Obidzinski, “Indonesia World Leader in Palm Oil Production,” Centre for International Forest Research, 8 July 2013, [blog.cifor.org/17798/fact-file-indonesia-world-leader-in-palm-oil-production#.VNEb6mTF\\_pA](http://blog.cifor.org/17798/fact-file-indonesia-world-leader-in-palm-oil-production#.VNEb6mTF_pA).

8 Milica Topalovic and Bas Princen, “From the Edge of a Cartesian Landscape,” [trans magazin](http://transmagazin.com) 24 (2014): 174–179.

9 Ann L. Stoler, [Capitalism and Confrontation in Sumatra’s Plantation Belt, 1870–1979](http://CapitalismandConfrontationinSumatrasPlantationBelt1870-1979) (Ann Arbor: University of Michigan Press, 1995), 1.

10 From interview conducted by the author with Ms. Juliana, PR manager of PT Sumatera Timberindo, Medan, 30 May 2014.

timber (*kayu bekas*). Many of Medan's remaining small-scale carpenters around Jalan Brigjen Katomso and Jalan Sentosa Lama source their raw material from demolished colonial buildings around downtown.<sup>11</sup> Alternatively, often illegally logged timber is imported to Medan and the North Sumatra Province from remaining forests in Indonesia. Not surprisingly, this limited supply of timber has driven up the price and narrowed the options of materials for most building developers and architects. These social and urban pressures have led to a decline in the use of traditional building materials. Additionally, for a vast majority of Medan's growing middle class, materials such as bamboo and wood are increasingly associated with either retrogressive building practices or poverty.<sup>12</sup>

First introduced by the Dutch, bricks (*batu bata*) have become the most important building material in Medan's construction industries. Since the post-independence boom of the Indonesian economy in the 1970s the application of bricks in construction has become inextricably linked to a "modern lifestyle"—a status symbol on par with air-conditioners. In comparison with timber structures, brick buildings are faster, easier, and more affordable to build. In an urban context, timber remains in use in low-income houses assembled from industrially produced wood-based panels (and other inexpensive building materials and components). Hence, the knowledge and expertise of how to construct with wood and use natural ventilation practices is fading and becoming obsolete.

As the exploitation of the rich local clay soils on the eastern outskirts of Medan has increased, small plantation villages such as Lubuk Pekam and Perbaungan have turned into "brick cities," where almost everyone seems to be involved in the production of bricks. Clay-carrying trucks, semi-formal factories, smoking kilns, and open-air drying fields dominate these suburbs, while the clay itself is sourced nearby, in between the palm oil plantations. This is because from a socio-economic point of view, the minimal initial investment needs and rudimentary mechanization lowers the bar to entry for even small-scale family-run companies. Also, brick production relies on heavy manual work, which means a high number of jobs for low-skilled workers in the region.<sup>13</sup>

11 From interview conducted by the author with Mr. Dede, managing director of Fuat's Carpentry, Medan, 30 May 2014.

12 From interview conducted by the author with Tavip Kurniadi Mustafa, chairman of board of education and Indonesian Institute of Architects, and member of the Sumatra Heritage Trust, Medan, 4 June 2014.

13 S. Röhling et al., "The Brick Clays from Northern Sumatra, Republic of Indonesia," *Ziegelindustrie International* 9 (2009): 44–52, [www.zi-online.info/en/artikel/zi\\_2009-09\\_The\\_brick\\_clays\\_from\\_Northern\\_Sumatra\\_Republic\\_of\\_Indonesia\\_311300.html](http://www.zi-online.info/en/artikel/zi_2009-09_The_brick_clays_from_Northern_Sumatra_Republic_of_Indonesia_311300.html).

Breathless: Making Buildings and Weather on Sumatra  
Dysfunctional Buildings in a  
Dysfunctional City

William Marsden, a colonial British orientalist, was probably the first scholar to highlight the complex interdependence of climate, culture, and construction in Sumatra's built environment. He writes: "In their buildings neither stone, brick, nor clay are ever made use of, which is the case in most countries where timber abounds, and where the warmth of the climate renders the free admission of air, a matter rather to be desired than guarded against."<sup>14</sup> Indeed, because of the hot and humid tropical climate, filigreed, air-permeable, and elevated building structures were required in Medan.<sup>15</sup> Being a diverse and multi-ethnic city, the Javanese, Batak, Chinese, Malay, Tamil, and Dutch worked with similar passive cooling techniques in their architectural styles. These included elevation above ground level to protect from humidity (and animal threats), overhanging roofs to offer shelter from the rain and shade from the sun, and cross ventilation to cool interior spaces. These "traditional" or "vernacular" construction practices formed a highly sophisticated symbiotic relationship between indoor and outdoor climates: "weather-conditioned" houses.

Today, natural ventilation through cross ventilation has an increasingly low profile in newly erected buildings, and Medan is infamous for being the Southeast Asian city with the highest amount of air pollution in terms of particulate matter.<sup>16</sup> With air sullied by traffic, manufacturing, and heavy industries, the smog, haze, and dust have become a reality people have to shield themselves from. As a direct consequence, modern buildings present themselves as hermetically sealed boxes offering a feeling of being protected in a shell.<sup>17</sup> They either completely rely on mechanical ventilation, such as air-conditioning, or, if there is no budget or insufficient natural ventilation, they are simply unable to offer a hospitable, hygienic, or healthy microclimate.

Like elsewhere in Southeast Asia, the contemporary incarnation of the Chinese shophouse, traditionally equipped with a central courtyard used for air circulation, dominates the city. However, the increasing demands of urban density had eroded this specific natural ventilation feature by the early 1970s. Now, these easy-to-build, walkable, three-to-four-storey, long

14 William Marsden, "The History of Sumatra: Containing an Account of the Government, Laws, Customs and Manners of the Native Inhabitants, with a Description of the Natural Productions, and a Relation of the Ancient Political State of That Island," (London: 1784).

15 Roesler, "Man-made Weather."

16 "2014 Air Quality in Cities Database," United Nations World Health Organization, [www.who.int/phe/health\\_topics/outdoorair/databases/cities/en](http://www.who.int/phe/health_topics/outdoorair/databases/cities/en).

17 From interview conducted by the author with Soehardi Hartono, architect, Medan, 28 May 2014.

*rumah toko* (literally “house shop”) are almost exclusively built with brick-infilled concrete frames to form walls according to a “one-brick lengthways” method of construction. The simplicity of this method does not require sophisticated experience in brick laying and is thus fuelling Medan’s real-estate boom. Shophouse structures and their often fixed or closed windows are almost completely autonomous from the outdoor weather conditions, creating their own microclimates dominated by stifling air. The old interplay of macro- and microclimates has been replaced by a new self-referential thermal regime. A few nominal efforts at technical innovation and the implementation of air-quality standards have been made to better adapt shophouses and other relatively new building typologies such as the *Perumahan Nasional* (a state-run mass housing program) to local conditions and lifestyles.<sup>18</sup> Meanwhile, the advisory role of architects and academics in this overheated and rapidly developing city has decreased to a minimum.<sup>19</sup>

Besides raising questions of climate comfort, shophouses must be seen as built manifestations of the country’s monopoly capitalism. Speculative developers are producing half-abandoned spaces (as most shophouses are often only used on the street level) with unappealing and generic façade designs. The staggering speed of the city’s booming real-estate market has enabled both developers/speculators and the informal (low-end) building sector to reshape the face of the city with little interference. It is not surprising, then, that today shophouses contribute to a large extent to the estimated sixty percent of the buildings erected without any prior approval by a designated authority in Medan.<sup>20</sup> This short-term economic success, however, is purchased at a catastrophic long-term social, ecological, and spatial cost.

Within Medan’s tropical environment, air-conditioning has become one of the most desirable assets on the real-estate market. However, these devices are not just adding to the property value, but also to ever-increasing energy consumption. Furthermore, access to air-conditioning has become a characteristic of class division and cultural homogenization, as in many regions in the Global South. For example, the character of Dr. Julius Superb in Mohsin Hamid’s novel *Moth Smoke* states the following about class and ventilation in Pakistan:

*The first group, large and sweaty, contains those referred*

18 Roesler, “Man-made Weather.”

19 From interview conducted by the author with Tavip Kurniadi Mustafa.

20 From informal interview conducted by the author with representatives of the Department of Spatial Planning and Buildings of Medan (*Dinas tata ruang dan bangunan*), Medan, 4 June 2014.

*to as the masses. The second group is much smaller, but its members exercise vastly greater control over their immediate environment and are collectively termed the elite. The distinction between members of these two groups is made on the basis of control of an important resource: air-conditioning. [...] They wake up in air-conditioned houses, drive air-conditioned cars to air-conditioned offices, grab lunch in air-conditioned restaurants and at the end of the day go home to their air-conditioned lounges to relax in front of their wide-screen TVs.*<sup>21</sup>

A major threat to these cooled and refreshed spaces is the security of the country's energy supply. The recently coined Indonesian term *biarpet* describes the repeated turning on-and-off of the electricity supply by local power plants due to supply shortages.<sup>22</sup> The often daily six-hour (or longer) rolling blackouts in Medan cause problems of all kinds, switching on the air-conditioner being just one.<sup>23</sup> They also contribute to the rising number of fires in the city, as many residents are relying on candles as light sources, in addition to the rise in the use of private diesel generators.<sup>24</sup> According to the BPS Indonesia (the department of statistics), only 16.18 percent of North Sumatran households with an air conditioner turn their devices off when the temperature outside drops below 25°C. Not surprisingly, when paired with dysfunctional building stock, the failure of existing centralized, state-owned electrical infrastructures and technological systems has ultimately created a forbidding environment to live in. Since the rising energy demands of the local industrial and building sector have not been met, many people are left trapped in buildings with unbearably hot, humid, and stagnant air. Using private electricity generators to keep the machines running or sleeping on the veranda (rather than inside the house) are short-term solutions to the problem. Today, many buildings in Medan have turned out to be microclimate traps, providing no real shelter from hazardous man-made weather for a large portion of the population.

### Masking the Human-Made Climate Trap

This is a serious and multi-faceted issue that requires long-term study. Even though it superficially appears that climatic autonomy has been achieved within these contemporary

21 Mohsin Hamid, *Moth Smoke* (New York: Farrar, Straus and Giroux, 2000).

22 “*Menyala dan padam secara berulang-ulang (tentang lampu)*” (“turning the lights on and off repeatedly”), wiktionary.org, id.wiktionary.org/wiki/biarpet.

23 Apriadi Gunawan, “PLN Criticized for Medan’s Ongoing Blackouts,” *The Jakarta Post*, 23 July 2010, [www.thejakartapost.com/news/2010/07/23/pln-criticized-medan%E2%80%99s-ongoing-blackouts.html](http://www.thejakartapost.com/news/2010/07/23/pln-criticized-medan%E2%80%99s-ongoing-blackouts.html).

24 Apriadi Gunawan, “Power Shortage Angers Residents,” *The Jakarta Post*, 26 February 2014, [www.thejakartapost.com/news/2014/02/26/power-shortage-angers-residents.html](http://www.thejakartapost.com/news/2014/02/26/power-shortage-angers-residents.html).



buildings in Medan, it is obvious that true indoor climate comfort can only be attained after cultural, social, and behavioural dimensions have been considered and acted upon across various scales. The sudden change in architectural typologies has caused significant regional consequences, as the nature-culture relationship is full of interdependent causes and effects. Man-made climate not only alters the human behaviour within buildings and the social class they represent; it also directly contributes to the vulnerable dependency of human habitat on the regional electrical infrastructure. The spatial scales are interlinked: processes that occur at one scale have unexpected effects at other scales which cannot be ignored.

Addressing climate in Medan through an institutionalized climate adaption plan reflected in local practice is, at best, underachieved. As Chao Ren et al. have suggested, the development of urban climatic guidelines and the implementation of mitigation measures (such as increasing greenery, creating air paths, controlling building morphologies, etc.) are necessary, especially in the rapidly expanding cities of developing and emerging countries and regions in the Global South.<sup>25</sup> Nevertheless, if any proposed solution reduces Medan's urban climate issues to merely a technical problem, then the complexity and intricacy of this issue have been gravely misunderstood. There is a great need for nuance and sophistication in understanding the challenges that face the city of Medan. In part, this means acknowledging that architectural problems are inseparable from social, cultural, and environmental problems. If we create living spaces while ignoring the complex and multi-dimensional impact of the outcomes, we will reproduce more of the same problems we are trying to solve in the first place. These are lessons and insights for architects and planners, reminding us to fully digest the complexity of the issues we are dealing with before we address it with an integrated approach. The message seems simple, but we need to approach these issues with sensitivity and respect if we want to create long-term and sustainable solutions with the best possible outcome for the people.

Neither on an architectural, urban, or territorial planning scale have the impacts of the complex changes of ecologies in the region led to a real "a ha!" moment in policy making. On the contrary, economic interests overshadow or bypass the

25 Chao Ren, Edward Yan-yung Ng and Lutz Katzschner, "Urban Climatic Map Studies: A Review," *International Journal of Climatology* 31, no. 15 (2011): 2213–2233.

implementation of already existing building norms, reducing them to absurdity. Economic growth, catalyzed by the effects of a highly profitable plantation business, has not only caused Medan to evolve into a breeding ground and laboratory for technical, social, and urban experiments, but it has set off a ticking time bomb of social and environmental injustice. Like air pollution, these problems have become an accepted side-effect of the rapid economic development in the region.

Returning to Tsai Ming-liang's film, the climate disaster he portrays alongside the urban alienation and deprivation of the protagonists is a troubling reality for the urban poor in the region. Being on the front line, particularly vulnerable to climate change and natural hazards, their exposure to health risks is exacerbated by overcrowded living conditions, and a lack of adequate infrastructure and services. The World Health Organization (WHO) stated that in 2012, low- and middle-income countries in Southeast Asia and Western Pacific Regions suffered a total of 3.3 million deaths linked to indoor air pollution, and 2.6 million deaths related to outdoor air pollution. Exposure to haze from fires, for instance, is more carcinogenic than smoking cigarettes. It is no surprise, then, that air pollution is now the world's largest single environmental health risk.<sup>26</sup>

For the Batak in North Sumatra there is a rich tradition of masks used in rituals, dances, and theatrical performances, or as ornaments for traditional houses. While ritual masks are often worn for shamanistic purposes—to mark rites of transition, to heal, and to communicate with ancestors—the masks placed at building entrances and corners are often there as supernatural protectors to stand guard against “evil forces.” Ultimately, these masks function to bind the wearers (and the watchers, too) to the social, biological, and cosmic order.<sup>27</sup> As protection from the man-made weather in the region increasingly fails, walking around with a new kind of mask seems to be turning from a post-apocalyptic vision into a common necessity. However, these makeshift plastic masks do not offer effective protection from fine particulate matter, neither for the film's outsider protagonists nor in real life. Instead, these masks are becoming a symbol of imminent death.

<sup>26</sup> “Burden of Disease from Ambient and Household Air Pollution,” World Health Organization, [www.who.int/phe/health\\_topics/outdoorair/databases/en](http://www.who.int/phe/health_topics/outdoorair/databases/en).

<sup>27</sup> “Among the Toba Batak people of northern Sumatra, communal houses were, and in some areas still are, richly adorned with ornate architectural carvings, painted in red, white, and black. The carvings consisted primarily of foliate geometric designs in low relief interspersed with the heads or figures of real or fantastic creatures, carved in the round. Although the ends of the house were adorned primarily with images of *singa* (composite creatures that served as supernatural guardians), the sides of the houses were often decorated with horses' heads, which also served as supernatural protectors.” “Architectural Ornament (Toba Batak People, Sumatra, Indonesia),” Heilbrunn Timeline of Art History (New York: The Metropolitan Museum of Art), [www.metmuseum.org/toah/works-of-art/1988.143.68](http://www.metmuseum.org/toah/works-of-art/1988.143.68).

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