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Divergent local responses to globalization: Urbanization, land transition, and environmental changes in Southeast Asia

Fig. 1. Study Area: Southeast Asia (SEA), its major cities, and bench mark cities of Tokyo, Taipei, and Shanghai in East Asia

Selected Publications

Published Datasets and Tools
• Peter, B. (2020). Data visualization published to ObservedHQ showing changes in agricultural land (as a percent of the total land area) in Southeast Asia countries from 1990 to 2016. https://observedhq.com/@kurtosscience/southeast-asia-globalization-urbanization-land-use

Fig. 2. Yangon Case Study, (top-left) Urban expansion of Yangon, Myanmar during 1990-2020. The urban built-up area expanded from 165 km2 in 1990 to 289 km2 in 2000, 329 km2 in 2010, and 217 km2 in 2020. (top-right) The changes in PM2.5, NO2, and CO concentrations in Yangon from 1997 to 2020. (bottom) Changes in concentrations of three air pollutants (PM2.5, NO2, and CO) with three socioeconomic variables (population, GDPpc, and # of vehicles) in Yangon. PM2.5 was positively associated with all three socioeconomic variables; NO2 decreased and increased with population and GDPpc, respectively; and CO declined with population and GDPpc.

Fig. 3. Empirical influences of major human system factors (economic, social, policy, health infrastructure, and urban environment status) on the prevalence rate (PR) of COVID-19 for the 151 countries from the 20-week study period (Fan et al., 2022b). Note: Foreign Direct Investment (FDI) has appeared to be an important factor for economic development, affecting urban environment as well as COVID-19 spread in our SEM model.

Fig. 4. Urban expansion of 4 case cities in Maritime SEA: Jakarta, Denpasar, Manila, and Iloilo.

Key research findings
(1) The urbanization and environment changes of Southeast Asia (also public health outcomes associated with that, Fig. 2) have been driven by economic development (including globalization and infrastructure development, e.g., dam construction) @ global scale, Fan et al. 2022a, SEA cities: Fan, 2022). This enriched our understanding of urbanization as they have distinct from either developed countries whose urbanization was mainly pulled by industrialization or from low-income, developing countries whose urbanization was pushed by poverty in rural areas.
(2) Globalization and the institutional force appear to be key determinants for urbanization & environmental (health) outcomes through different types of local responses (e.g., urban expansion of Denpasar and Iloilo driven by international tourism Fig. 4).
(3) The co-evolution of urbanization, economic development, and environmental/climate/health (e.g. Yangon) (env), Fig. 4; Global scale, Ouyang et al., 2022 (climate), & Fig. 3 (health)).
• urbanization affected global climate change through albedo changes - The abiotic decrease from urbanization in 2018 relative to 2001 has yielded a 100-year average annual global warming of 0.00014 [0.00008, 0.00021] °C. Without proper mitigation, future urbanization in 2050 relative to 2018 and that in 2100 relative to 2018 under the intermediate emission scenario (SSP2-4.5) would yield a 100-year average warming effect of 0.00157 [0.00057, 0.00179] °C and 0.00515 [0.00078, 0.00259] °C, respectively, through altering the Earth's albedo. (Ouyang et al., 2022.)
• concentrations of air pollutants have different dynamics to be associated with population, GDPpc, and # of vehicles in Yangon (Fan et al., in review)

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