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Editor's invitational series: Human behavior as the warming of earth accelerates

I have welcomed comment from our Editorial Board and other experts on this topic, consistent with a major focus of our journal. First comment received is from Koong Hean Foo, PhD (Psych, NZ); PGD (CBT, NZ), Psychology Lecturer, James Cook University, Australia at JCU Singapore, which follows below. -Robert F. Morgan, Editor

As the Earth warms Singapore

My personal observations on climate change and its effects in Singapore are based on the following report:

Climate Change & Singapore: Challenges. Opportunities. Partnerships.
Published by: National Climate Change Secretariat
Prime Minister's Office
Republic of Singapore
www.nccs.gov.sg

Singapore is a small, low-lying and highly urbanised city-state, with over 5.5 million people on a land area of about 710 sq km, exposed to the effects of climate change as the earth warms up. Much of Singapore lies within 15m above the mean sea level; the ground level of about 30% of Singapore is less than 5m above the mean sea level.

According to the report, the expected effects of changing weather patterns on Singapore would include accelerated coastal erosion and higher incidences of intense rain or prolonged drought, influence on the biodiversity of plants and animals, and greenery, and possible disruptions to food supplies and business supply chains.

Actual effects seen in Singapore so far include: rises in sea level and ambient temperature. Singapore annual mean surface temperature has risen from 26.8°C in 1948 to 27.6°C in 2011. The mean sea level in the Straits of Singapore has increased by about 3mm per year over the last 15 years. Rainfall has been more intense in recent years.

Observations

- Clouds are coming lower. Thirty years ago, lightning would strike 5 seconds after the thunder sounded. Today, it is a mere 1 or 2 seconds before it hits. Hence, the possibility of more lightning strikes on the ground.
- More and more buildings are constructed with huge air-conditioning systems or multiple air-conditioners. This means a larger requirement or draw on the supply of energy driving the air-conditioners.

The Singapore government has made a great effort to reduce climate change while accommodating existing ones. Some examples are highlighted here.

1. Since 1991, all new land reclamation projects have to be built to at least 1.25m above the highest recorded tide level. In 2011, the minimum land reclamation level for new projects was raised by an additional 1m to ensure that the new reclaimed land is safeguarded against long-term sea level rise. Currently, about 70% to 80% of Singapore's coastal areas have hard walls or stone embankments, which help protect against coastal erosion. The rest are natural areas such as beaches and mangroves.

Observation

- A full study is needed on the effects on the eco-system following reclamation of land.

2. Fuel oil was replaced by natural gas – about 80% of Singapore's electricity is generated by natural gas.
3. There is much encouragement for greater use of public transport and improved energy efficiency in industry, buildings and households.

Observations

- Public transport (trains and buses) is frequently packed with passengers. There is a need to investigate the health concerns of commuters travelling in such conditions.
- Commercial buildings have their air-conditioners tuned to low temperatures to 'cool' the customers quickly apparently. Is this the way to save energy?
- Individual air-conditioners (units) are stacked one above the other in apartments. This arrangement only serves to

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bring the emitted heat of the air-conditioner compressor to the upper level household. Hence, the usage of air-conditioner is necessary to keep out the hot air from below. Is this energy efficient?

4. Singapore has added two sources of water for use: NEWater (ultra-clean and high grade reclaimed water) and desalinated water.

Observations

- This has maintained a prolonged supply of drinking water.
- But how safe is this water? Chemicals are added to purify water, and then chemicals are added to ensure the water has minerals for the consumers. Are these chemicals safe (compared to chemicals used in agriculture and food industries)?

Overall (in the report):

- There is no mention of the annual haze generated from Singapore's neighbouring countries which is the result of the burning of agricultural waste.
- There is also no mention of Singaporeans leaving the country as a result of climate change.

-Koong Hean Foo, PhD, Singapore

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