Thanks to climate change, nights are warming faster than days

QUAMRUL HAIDER

IN 1895, while studying past Ice Ages, Swedish chemist Svante Arrhenius showed that if carbon dioxide levels in the atmosphere were halved, temperatures could decrease by about five degrees Celsius. He also showed that temperatures would increase by the same amount if the amount of carbon dioxide was doubled. His work demonstrates that the right concentration of carbon dioxide is essential for sustaining life on Earth.

Arrhenius' study may have been purely of theoretical interest, but decades later, modern climate models have confirmed that his numbers are not far off the mark. Today, we know that too much carbon dioxide in the atmosphere has made our planet hotter, triggering widespread changes in the Earth's weather patterns. In fact, this summer kicked off with searingly hot temperatures for many of us in the northern hemisphere. New all-time highs were set across the United States, in western Canada and in towns near and above the Arctic Circle in Europe. The end is not yet in sight. The flashing red spots on weather maps are signalling another heat wave, this time covering most of the US.

One of the most "perverse" effects of climate change is balmy nights. During the last 50 years or so, nights are warming at a much faster rate than days. There are several plausible scientific explanations for this asymmetrical warming. First, the greenhouse effect responsible for global warming operates 24/7. Second, nighttime temperatures are inherently more sensitive to climate forcing.

More importantly, Earth's "energy imbalance," which is the difference between the amount of solar energy absorbed and the amount of energy emitted, almost doubled in the last 15 years. Obviously, any increase in the energy imbalance means the overall climate system of the planet is gaining energy, thereby raising both the nighttime and daytime temperatures. However, during daytime, the extra energy is spread through a thick layer of the atmosphere, up to a few kilometres from the ground. So the air warms slowly. At night, the extra energy is trapped in a thin layer, just a few hundred metres near the ground. Thus air at night warms quickly.

Warmer nights are more pronounced in big cities than rural areas due to the heat island effect, a term used to describe higher air temperatures in an urban setting as opposed to the lower temperatures found in rural areas. Cities and their suburbs have a lot of asphalt roads, pavements and concrete structures whose surfaces absorb copious amount of solar radiation during the day but does not dissipate it as quickly at night. Hence, warmer nights.

One of the effective strategies to make nights

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relatively comfortable is by painting roofs with white reflective paint to reduce heat absorption. As a longer-term plan, some large cities are using lighter colour and water-retaining paving options for roads. Furthermore, planting trees and other vegetation, preserving lakes and rivers, and creating artificial water surfaces and large-scale heat retention expanses, can keep the night as well as day temperatures under control.

Hot summer nights can lead to significant health-related problems, because they take away our ability to cool down from the overly high temperature. One of the main mechanisms for our body to cool down to a core temperature of about 37 degrees is through sweating. When temperatures fail to drop at night, sweat does not evaporate as efficiently. Less evaporation means the body has trouble cooling itself off. As a result, the sweat clings to our body and body temperature

PHOTO: **REUTERS/MIKE BLAKE/FILE PHOTO**

can, in effect, rise. The body nevertheless works harder and harder to lower its temperature, putting more stress on organs like the heart. At the same time, too much sweating leads to the loss of fluids and electrolytes in our body.

In addition, there is a threshold temperature—35 degrees—beyond which the human body cannot sweat enough to cool itself down. Known as the "wet bulb" temperature, the threshold is determined by wrapping a wet wick around the bulb of a thermometer. The ambient temperature, which is always greater than the wet bulb temperature, is called the dry bulb temperature. The difference between these two temperatures is a measure of the humidity. When wet bulb temperatures are very high, the difference is close to zero and the humidity of the air is well-nigh 100 percent. Consequently, sweating becomes ineffective at removing the body's excess heat.

Steamy nights spell trouble for people with

underlying health conditions, all at a time when the body is supposed to be resting. Age can also be a factor in how we respond to heat while we are asleep. Young children and elderly people are more likely to experience heat-related illness than older children and adults.

While air conditioning can provide a respite from intense heat, it is not a panacea. Air conditioners work by dumping hot air from inside a house to an even hotter air outside, thus adding more heat to the atmosphere. Besides, fossil fuels that provide power for air conditioners exacerbate climate change. Also, increased use of air conditioners tax electrical grids, making power failures more likely. Clearly, air conditioners make a sizeable contribution to global warming.If air conditioners are climate unfriendly, then how about fans? Contrary to popular belief, fans do not cool air, they just move it around. Having a fan blow air that is hotter than our body temperature can actually make it more difficult for our body to shed heat by sweating. But if the indoor air temperature is in the low 30s or below, turning on a fan can create an artificial breeze that will help evaporate sweat from our skin, making us feel cooler. Moreover, if the blades of ceiling fans rotate counterclockwise, they will push cooler air down towards the floor, producing a somewhat summer breeze effect. Clockwise rotation will raise the temperature as it will create an updraft that will send the warmer air near the ceiling back into the living space.

Finally, as we try to cope with precedent-shattering extreme temperatures, one overwhelming conclusion is: Thanks to human-induced climate change, temperatures are increasing rapidly during nights. And this trend is likely to continue in the coming decades unless we are serious about arresting global warming.

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Cyber intelligence needed for enhancing national security

GP ACHARYA

THE tech and cyber worlds were outraged this past week as the Pegasus Project investigation unveiled the massively unethical software hacking and data leak by use of spyware. Various international media including *The Guardian, The Washington Post* and Reuters, among others, reported that Pegasus spyware was used as part of cyber surveillance in many countries that hacked hundreds of smartphones belonging to heads of states, heads of government, government officials, politicians, diplomats and ambassadors, judiciary and media persons, and human rights activists, among others.

The King of Morocco, the President of France, and the prime ministers of Morocco, Egypt and Pakistan are included in the target list of more than 50,000 phone numbers, stated *The Washington Post. Le Monde* further reported that several Delhi-based diplomats and ambassadors, including the Nepalese ambassador, are on the potential targets' list, as are Pakistani government officials. "The numbers of Imran Khan [Prime Minister of Pakistan] and several of his ambassadors in India appear on the list as potential targets. Dozens of other Delhi-based diplomats and ambassadors are included, from Iran, Afghanistan, China, Nepal and Saudi Arabia," stated *Le Monde.*

The spyware called Pegasus is reportedly licensed by the NSO Group, an Israeli company. Once this malware infects Android and iPhone devices and smartphones, it can extract messages, photos and files from the device and secretly activate cameras and microphone. Smartphone users remain unaware as to whether their device is infected. The NSO Group claims it sells that spyware

only to governments, for intelligence and legal agencies to use it against criminals and terrorists. Instead, it has been used to target government and international agencies' officials, heads of states and governments, diplomats, and other government and public officials.

It is condemnable that these actors are being spied on. Snooping on government officials and diplomats may lead to a gap of trust between nations and erode bilateral relations, if it is proven that the governments of the host states themselves are involved in a conspiracy to spy on officials of the sending states. It is a grave threat to the national security and sovereignty of nations whose officials are being hacked.

Billions of people worldwide use mobile phones as their primary source of communication and many depend on the

PHOTO: **REUTERS/KACPER PEMPEL/ILLUSTRATION/FILE PHOTO**

internet and social media as a major source of information. Data shows that nearly 3.8 billion people, 48.33 percent of the global population, use smartphones, out of more than 5.27 billion who use mobile phones worldwide. By 2023, worldwide mobile users are likely to cross 7.33 billion, predicts Statista, a market and consumer data portal. According to the Global System for Mobile Communications Association (GSMA), there are more than 10.38 billion mobile connections, including cellular Internet of Things, worldwide. In addition, there are more than 4.72 billion internet users and 4.33 billion who use social media; average internet penetration is 59.5 percent globally, while it is 96 percent in northern Europe (real-time GSMA intelligence data as of January 2021).

In Bangladesh, total internet subscribers

number 117.31 million (107.50 million mobile internet and 9.81 million ISP plus PSTN users), and internet penetration is 28.8 percent. There are 175.27 million mobile subscribers (as of May 2021) and more than 45 million social media users, stated the Bangladesh Telecommunication Regulatory Commission (BTRC).

Mobile subscriptions are more than the total population in Bangladesh (as it is in neighbouring Nepal). The Internet and social media are public platforms where large amounts of public data that influence public policy, decision-making, politics, diplomacy, military, research, intellectual property and finance are shared. The crucial task is to manage, monitor and secure this digital data, while massive amounts of data are being assembled and exploited by various state and non-state actors. Due to the poor digital infrastructure in banks, power-grids, telecom and airports, Bangladesh and Nepal have frequently witnessed critical cybersecurity threats. This has been an emerging challenge for their national security.

Amid the high possibility of cyber-battles between the two populous and economic giant rivals India and China or between arch-rivals India and Pakistan, neighbouring countries need to strengthen cybersecurity preparedness in advance. Governments need to think in advance of establishing a dedicated cybersecurity centre. Taking into account geo-location, geo-political proximity and dependency on others, countries need to march ahead into the spheres of artificial intelligence and big data. Data and technological sovereignty will be key to determining power capability and wealth for nations.

The Global Cyber Security Index 2020 shows that Bangladesh and Nepal rank 53rd and 94th respectively in global rankings out of 182 countries, and 11th and 17th respectively out of the 37 countries in the Asia-Pacific region. Previously, in 2018,

they were at the 78th and 109th positions and ranked 15th and 20th respectively regionally. The index is assessed based on the countries' engagement in five key measures—legal, technical, organisational, capacity development and cooperation. Both Bangladesh and Nepal have significantly progressed in the cybersecurity sphere in recent years. Nevertheless, rising in the index alone may not bring cybersecurity to our two countries. They have to be pragmatic in devising strategic and intelligence policies, and have to foster partnerships with the concerned security agencies, ICT providers, industries, academics, and civilians for a sustainable cybersecurity situation. Various legislative policies regarding big data, data protection, privacy, intellectual property, cyber-crime and cyber-terrorism, among others, need to be revised and updated based on the contemporary needs of the society and nation. National security policy has to be pragmatically shifted to developing a resilient national cybersecurity architecture.

Learning from past failures of political, diplomatic and security intelligence as well as internal weaknesses and power conflicts at various junctures of history, both countries need to take pragmatic steps in upgrading their intelligence mechanisms. For this, they need to invest rationally in intelligence and develop a sound intelligence culture as part of a soft security strategy. Advanced and updated technology needs to be used to gather information from the political sphere around the world. Improved communication systems and corresponding data security are essential for countries like Bangladesh and Nepal. Technically, an advanced intelligence unit needs to be set up such that it would provide time-sensitive data on a real-time basis, which will enable the countries to enhance national security.

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CROSSWORD BY THOMAS JOSEPH

ACROSS
1 Aphrodite's love
5 Nest sound
10 Identified
12 Like some eclipses
13 Owned by thee
14 Blow away
15 Assn.'s kin
16 Mole, e.g.
18 Coffee, in slang
19 Aslan's place
21 "Nuts!"
22 They're handed down between generations
24 Prom crowd
25 Plane designer's concern
29 Jupiter's wife
30 Samples
32 Trickery
33 Rep.'s rival
34 Pillbox, for one
35 Car choice
37 Answer to "grazie"
39 Stellar hunter
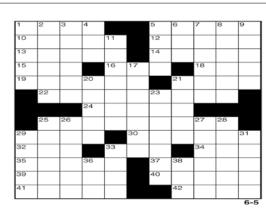40 Muscular power
41 Bonkers
42 Au naturel

DOWN
1 Composer Bruckner
2 Gung-ho
3 Asylum seeker
4 Capitol Bldg. figure
5 Potter's stuff
6 Engine sound
7 Trouble-ridden
8 Stubble removers
9 Hog the mirror
11 Wants
17 Choice of colors
20 Blasting stuff
21 Rx amounts
23 Cloverleaf parts
25 Dawn goddess
26 Sense
27 Goddess of wisdom
28 Paltry
29 Esau's twin
31 Vermont resort
33 Refuse
36 Poker prize
38 Vault part

YESTERDAY'S **ANSWERS**

O	S	C	A	R		B	O	S	C	H
N	I	E	C	E		O	P	E	R	A
A	R	T		R	E	D	R	O	S	E
I	R	E		O	R	E		N	O	D
L	A	R	K		G	R	A	D	E	
	F	I	B		S	U	B			
	D	I	N	A	H		K	A	L	E
F	E	E		R	A	G		S	O	X
E	N	L	A	R	G	E		E	W	E
R	I	D	G	E		T	I	M	E	R
A	R	E	E	L		I	C	A	N	T
L	O	R	D	S		T	E	N	D	S

BEETLE BAILEY BY MORT WALKER

BABY BLUES BY KIRKMAN & SCOTT

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