

Develop Chattogram's drainage system before more lives are lost



NAWSHAD AHMED

CHATTOGRAM, the country's second largest city and home to its main sea port, with an estimated population of 52 lakh people, has been suffering from serious water-logging and drainage issues for a long time. The problems worsen during the monsoon season every year due to heavy rains, disrupting daily lives and local businesses. The damage during the last decade, calculated by the Planning Commission, has been worth over Tk 250 crore annually, on average. It has reached a point where even lives have been lost as a result—in September this year, a 19-year-old student died after falling into a roadside drain. This was the fourth such death in the city that occurred during the June to September period.

Unplanned urbanisation is a major cause of water-logging in the densely populated city. There are about 40 canals in the port city, locally known as khals. There used to be many more ponds and other water-retaining areas that have been filled up due to the fast pace of spatial development. Thus, water cannot flow down to the river quickly anymore, resulting in the inundation of city roads and residential areas. According to the District Fisheries Department, the total number of water bodies in the city was 19,250 in 1991, which came down to 4,523 in 2007, as reported by the Chattogram Development Authority.

The major canals running through Chattogram city are Chaktai Khal, Rajakhali Khal, Mahesh Khal, Jamalkhan Khal and

Nasir Khal. All these canals play very important roles in draining rainwater out to the Kamaphuli river in the south of the city. However, these canals have all been narrowed down, and many have even disappeared in different places. A considerable amount of siltation has reduced the water flow capacity, and canals have also been filled up with garbage and solid waste, which have not been excavated properly for many years. The city areas that suffer the most severely due to water-logging are Bakalia, Chawkbazar, Agrabad, Halishahar, Kapasgola, Chandgaon, Shulakbahar, Bahaddarhat and the Probartak intersection. Katalganj and Firingi bazar, two major business centres, are highly vulnerable to water-logging and incur huge losses every year.

As has been reported in news media recently, especially after the recent deaths—the open drains pose major risks for city-dwellers. In Chattogram city, four different agencies are responsible for the maintenance and provision of an adequate and environment-friendly drainage system, which includes cleaning, excavation of canals, non-encroachment and development work. These are Chattogram Development Authority (CDA), Chattogram City Corporation (CCC), Chattogram Water and Sewerage Authority (WASA) and Bangladesh Water Development Board (WDB). The level of cooperation and coordination among these urban agencies is definitely not strong enough for effective management and operation of the drainage system.

The CDA undertook a Tk 5,617 crore project in 2017 for the proper planning and construction of drains to mitigate water-logging in the city. The project started with a two-year delay and so far, 60 percent of the



Residential neighbourhoods, hospitals, government offices—this monsoon, few areas in Chattogram could escape the wrath of water-logging.

PHOTO: RAJIB RAIHAN

work has been completed (Tk 2,700 crore has been spent), and the new completion deadline has been established as June 2023. The CCC also undertook a project worth Taka 1,256 crore six years ago, whose newest deadline passed us by last month. Yet, according to an August 3 report from *The Daily Star*, the project work had not even started by that point due to complications in acquiring land. The Water Development Board (WDB) has also been involved in solving the city water-logging problem and has undertaken a Taka 1,620 project in 2019,

which it has barely started to implement.

Inadequacy of drainage channels creates adverse impacts on environment and public health. A well-designed urban drainage system in Chattogram is a necessity that we cannot ignore anymore. The issue of water-logging is not, however, only an issue of the implementation of different development projects. It is one of constant efforts to keep water channels clean, retain water bodies in and around the city, reclaim illegally occupied canals, and build awareness on the value of proper disposal of household and

commercial waste in their designated places, instead of throwing them into water bodies and canals.

At the same time, an approach to use natural drainage channels, as well as build wide drains, should be the strategy to cope with the issue of water-logging in Chattogram city. The use of good quality materials should be ensured in the construction work for durability, and the drains should be constantly kept clean to avoid water-logging. The policy should be to construct covered drains and follow a city-wide approach. Piecemeal approach to drain construction ends up being non-functional and can even make matters worse. Proper planning to stop indiscriminate urbanisation is also an essential prerequisite to ensuring a viable drainage system.

Water-logging can be mitigated by properly designing drainage networks and facilities. We should be expecting between two to four percent urban growth annually in Chattogram city, and should be planning the city as well as its future drainage system to cope with this growing urban population. The massive investment projects undertaken by the CDA, CCC and WDB should be completed rapidly to contain the city's water-logging problem. This cannot be done without stronger coordination between these three organisations, along with other government service agencies responsible for telephone, electricity, gas and water supply who have laid down their lines through the canals. Last, but not least, adequate operation and maintenance provision should be kept in the annual budgets of these organisations.

Dr Nawshad Ahmed is an economist, urban planner, and a former UN official.

Can humans settle on Mars once Earth becomes uninhabitable?



QUAMRUL HAIDER

IN 1920, American poet Robert Frost mused: "Some say the world will end in fire, some say in ice." Frost held "with those who favour fire." His poetic view unsurprisingly coincides with mainstream scientific consensus about the real prospect of our own annihilation—arising from the incomprehensible scale of problems baked into our future by human-induced climate change. That is why probably a year before his death in 2018, the celebrated British astrophysicist Stephen Hawking issued a grave warning that we must leave the Earth and colonise "other planets in the next century in order to guarantee survival from a variety of threats."

Now that the much-hyped COP26 has ended "not with a bang, but with a whimper," it is time to seriously consider Hawking's suggestion—colonise another planet before the Earth ends in fire.

From *The War of the Worlds* by HG Wells to *The Martian Way* by Isaac Asimov, science fiction writers have long been fascinated by the idea of settling on another planet, especially Mars. Science fiction aside, it is indeed the dream of a growing number of scientists and geo-engineers to make Mars inhabitable with some terraforming, a term used to describe transforming another planet into an Earth-like planet.

Why Mars and not the Moon? The Moon, our nearest neighbour in the sky, is impoverished in resources. Furthermore, a day on the Moon is 29.5 Earth days long. Also, the Moon being far less massive than Earth has a weaker surface gravity—about 16 percent that of Earth. For example, a fully suited Apollo astronaut (equipment included) who weighed about 500 pounds on Earth, weighed only about 80 pounds on the Moon.

Why not other planets? The inner planets, Mercury and Venus, are too hot for humans to survive. The Jovian planets, Jupiter outward

to Neptune, are gaseous, which means they do not have solid ground to put our feet on.

What makes Mars, which is on the outer boundary of our solar system's habitable zone, a good candidate is its proximity from Earth's closest approach every 15 to 17 years is about 54.6 million kilometres, its day-night cycle is almost the same as ours, with abundant sunshine, and it has a 687-day year with Earth-like four seasons that last twice as long. Although gravity on Mars is 40 percent that of Earth's, it is sufficiently strong

for human beings. Nonetheless, in the ancient past, the Red Planet was remarkably habitable, featuring lakes, rivers and an ocean. Things, however, changed dramatically after the planet lost its magnetic field about four billion years ago when its molten iron core froze up. Without a magnetic field, charged particles in the solar wind stripped away Mars' once-thick atmosphere, eventually reducing it to a thin sliver that could no longer retain sufficient heat. As a result, the planet underwent a reverse greenhouse effect.

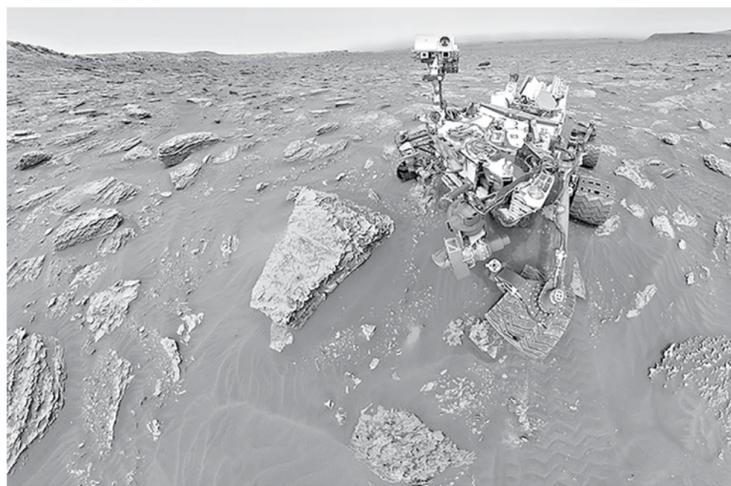


PHOTO: NASA/JPL-CALTECH

Curiosity took this selfie on Martian Sol 2082 (June 15, 2018 Earth time).

to retain an atmosphere and is believed by many to be adequate for the human body to adapt to. Additionally, hydrologic and volcanic processes on Mars are likely to have consolidated various elements into mineral ores that are of interest to an industrial society.

But current conditions on Mars—freezing cold and bereft of such amenities as a breathable atmosphere—are inhospitable

Today, the greenhouse effect on Mars is extremely inefficient. Its atmosphere, about 100 times thinner than Earth's, is not thick enough to act as a thermal blanket to keep the planet pleasantly warm. Average surface temperature on Mars is a frigid negative 55 degrees Celsius and varies between negative 125 degrees near the poles during winter to positive 20 degrees at the equator during summer. In addition, the atmospheric

pressure is less than one percent that of Earth's. Since the atmosphere is excessively thin and cold, Mars cannot support liquid water on its surface, but this does not mean the planet is devoid of it.

Thus, before we colonise Mars, we have to fix the Martian atmosphere and make it hospitable to human life. In particular, we have to raise the planet's temperature to a comfortable level and make the atmosphere thicker. Several possible ways of accomplishing this task have been proposed. Among the many techniques that are on the drawing board, scientists are seriously considering adding temperature-raising gases in its atmosphere, to melting parts of the Martian polar ice caps using giant orbiting mirrors to reflect sunlight, to making the Martian surface non-reflective.

Introduction of fluorine-based compounds that produce a greenhouse effect thousands of times stronger than carbon dioxide is being considered as a long term climate stabiliser. There is also the possibility of in-situ resource utilisation, thanks to NASA's Curiosity Rover discovering subterranean methane, another potent greenhouse gas.

Another element that could play an important role in trapping heat on Mars is aerogel, one of the lightest materials known to humans. Composed of 99 percent air, it is also a good insulator, which is why it is being used in the Rover mission. Using modelling and experiments that mimicked the Martian surface, researchers from the Harvard University, NASA's Jet Propulsion Lab and University of Edinburgh demonstrated that a thin layer of this material increased average temperatures of mid-latitudes on Mars to Earth-like temperatures. Aerogel could also be used to build domes for habitation or self-contained biospheres on the surface of Mars.

If large mirrors can successfully be put into orbit, they will reflect sunlight onto Martian poles, so that carbon dioxide and other greenhouse gases that are believed to be trapped inside the ice will melt and initiate the greenhouse effect. The orbital mirror plan has the advantage of continually introducing extra heat into the Martian climate long after the poles have sublimated.

The idea of coating the surface of Mars with dark materials in order to increase the amount of sunlight it absorbs was first proposed by author and scientist Carl Sagan. The materials could be dust from the Martian moons Phobos and Deimos—two of the darkest objects in the Solar System—or extremophile lichens and plants that are dark in colour.

As noted above, Mars does not have a magnetic field strong enough to shield it from the harmful electrically charged particles in solar wind. Scientists at NASA think that it is possible to deflect the solar wind by positioning powerful magnets at one of the five points in space between Mars and the Sun, known as Lagrange Points, where the gravitational forces and the orbital motion of the magnets would interact to create a stable location. Simulations showed that a shield of this sort would protect Mars from the solar wind.

A new study suggests that Mars could be provided with a magnetic field by creating an artificial ring of charged particles around the planet. This could be done by ionising matter on the surface of its moon, Phobos, which orbits the planet quite closely and makes a trip around it every eight hours. The ionised (electrically charged) particles, when accelerated, would generate an electric current that would give rise to a magnetic field strong enough to protect a terraformed Mars.

How soon can Mars be terraformed? Realistically speaking, once technologies are perfected, it would probably take several centuries for the Martian climate to resemble anything even remotely Earth-like. Will our planet remain habitable for such a long time? That is a moot question.

Finally, it is ironic that many of the approaches to terraform Mars represent the global environmental catastrophe currently causing such concern here on Earth. In view of this, opponents consider terraforming Mars to be the ultimate in "cosmic vandalism." Proponents on the other hand see terraforming as the creation of a new Garden of Eden.

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QUOTABLE Quote

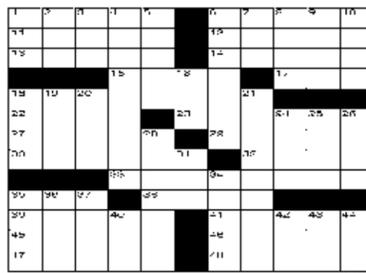


ELIE WIESEL
Romanian-American writer
(1928 - 2016)

There may be times when we are powerless to prevent injustice, but there must never be a time when we fail to protest.

CROSSWORD BY THOMAS JOSEPH

- ACROSS**
- 1 Fissure
 - 6 Rays' home
 - 11 Eagle's home
 - 12 Shark's home
 - 13 Supply with new weapons
 - 14 Respond to stimuli
 - 15 Reach across
 - 17 Golf peg
 - 18 Kind of candidate
 - 22 Melville captain
 - 23 Some potatoes
 - 27 Last
 - 29 River of Missouri
 - 30 Flings
 - 32 Floor piece
 - 33 Specimens
 - 35 Ga. Neighbor
 - 38 Revered one
 - 39 Purple hue
 - 41 Egypt's Anwar
 - 45 Pal, to Pedro
 - 46 Deli fixture
 - 47 Board, as a bus
 - 48 Saudi Arabia neighbor
- DOWN**
- 1 Train unit
 - 2 Director Spike
 - 3 Pitching stat
 - 4 Corner on a diamond
 - 5 Musical speed
 - 6 Twister
 - 7 Star pitcher
 - 8 Ham or veal
 - 9 Speed
 - 10 Poker payment
 - 16 "Exodus" hero
 - 18 Ludicrous
 - 19 River from Pittsburgh
 - 20 Soup buys
 - 21 The cellar, in sports
 - 24 Hard precipitation
 - 25 Lusty look
 - 26 Beholds
 - 28 Dictionary
 - 31 Feeling down
 - 34 Like forest rocks
 - 35 National symbol
 - 36 Green fruit
 - 37 Stepped down
 - 40 In the past
 - 42 River blocker
 - 43 Hearty quaff
 - 44 Wallet bill



YESTERDAY'S ANSWERS

W A S P S L E A S H
A T E U P A T S E A
S H A R E W A T E R
T E T R A S U K E
E N E R C I T E S
S A D H A L T E R
G E N E S
A L P A C A P A L
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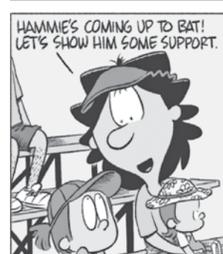
BEETLE BAILEY



BY MORT WALKER



BABY BLUES



BY KIRKMAN & SCOTT



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