PRME
an initiative of the
United Nations Global Compact

A JHBC UNPRME NEWS FLASH

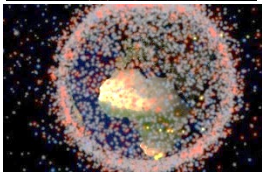
THE JACK H. BROWN COLLEGE, PRESENTS:

A PRME NEWS FLASH: Vol.1(9) September 2022

Researched and Developed: by Emeritus Professor Breena E. Coates, Ph.D.

THE WICKED PROBLEM[1] OF WASTE & UN SDGs 11 and 12 ADVISORY

THE WICKED PROBLEM OF SPACE DEBRIS: Associate Dean, **ANNA NI's** scholarly article, "*Can the Market Solve the Wicked Problem of Space Debris?"* published in the PA Times brings up the difficulty of solving ill-structured, or "wicked" problems. Earlier articulated by leading scholars, such as C. West Churchman, Rittel and Weber, and Ian Mitroff, the wicked problem, also known as the ill-structured problem, has tended to elude solutions precisely because a wicked problem is hard to solve, due to its many actors and multiple conflicting explanations.



Dr. Ni's above referenced article brings up the important, but "wicked" problem, of space debris. She writes: "*When Elon Musk and his crew orbited Earth in September 2021, the world was amazed at how the free market plunged into space exploration, a previously government dominated arena". Apparently, Musk's SpaceX is driven by the desire for the profitable market share of a booming space industry rather than pure curiosity, even though the company has not yet claimed a return on investment. In 2020, the turnover in the global space economy was approximately US $446.9 billion, among which commercial space products and services account for almost 50 percent of the total. Whereas entrepreneurs like Musk are anticipating a return on their invested capital, could public policy analysts expect that market mechanisms will address the problem of space debris, a negative externality from space exploration?"*

Space debris, also called space junk, is composed of artificial materials that are orbiting Earth but are no longer functional. The size of such materials can range from something as small as a microscopic chip of paint to one as large as a discarded rocket stage. Much of the debris is within

[1] Rittel, H, and M. Weber, "Dilemmas in a General Theory of Planning. *Policy Sciences*, Vol. 4, No. 2 (Jun., 1973), Churchman, C.W. *The* Systems Approach, 1984 Dell Pub Co; Sagasti, F. and I. Mitroff. "Operations research from the Viewpoint of General System Theory", in C. West Churchman (Ed.), Systems and Management, New York, Petrocelli/Charter, 1975. p. 71-85.

1,200 miles of Earth's surface in low Earth orbit, along with 3,372 satellites (as of 2021), however, some debris can be found in geostationary orbit 22,236 miles above the equator. [2](Images, pg., 1: Above Left : *www.express.com.uk; Above Right www.kold.com; Above Right Below: Business Insider).*

Dr. Ni continued, "*as of 2022, the U.S. Department of Defense's Space Surveillance Network has been tracking roughly 22,300 of these objects. .... operational satellites, spacecraft and space stations. ...Moreover, simply having so much debris in orbit creates the potential for the problem to become increasingly worse over time all on its own."*

DESTRUCTION OF AN HIMALAYAN SHANGRI-LA: The tallest mountain in the world, Mt. Everest, which is 8848 meters (29,029 feet) above sea level, used to be a pristine place, and sometimes referred to as and once the venue for serious mountain climbers and scientific researchers. No more. It is becoming a mountain of garbage. (Image Left: NY Post.com)

The wicked problem of human waste is now upon the once-pristine slopes of Mount Everest. In the few short years since Sir Edmund Hilary summited it in 1953, Mount Everest is today another exotic place to go, often for nothing more than bragging rights for those sight-seers of a certain class who can afford the $50,000 (or more) to attempt to scale its steep slopes and high valleys. Continued over-use and tourism have created a chaotic mess on the mountain that some call *Qomolangma* –i.e., Tibetan: "Holy Mother". (Image Right: Nepal24hours.com)

Recently, 26,000 pounds untreated human waste were accumulated from and around Everest camps by the Mount Everest Biogas Project. Over 60,000 pounds of trash and 17,000 pounds of human feces is predicted to be left on

[2] The geostationary orbit matches the earth's orbit which makes, for example, a satellite in geostationary orbit, appear to be standing still

Mount Everest and surroundings. [3] The multi-layered types of trash include food wrappers, bottles, oxygen cylinders, camping gears, metals, glass, batteries, medical supplies, human excreta, and dead bodies. The high altitude and frigid temperature hinder the natural biodegradation and decomposition process of trash, and this in turn poses pernicious disposal problems for the nation of Nepal. Moreover, climate change and global warming are exposing frozen garbage including the **human bodies** that have been buried under snow for decades.

(Many people have died on the mountain, and the bodies have been left because it is too difficult to carry them down for burial.)

It is not just the waste that poses a threat at Everest, but an ever increasing dangerous **traffic jam** of people on its slopes. (Images Above Left: www.newshub.co.nz; Above Right; IndiaToday.com)

There is saying*: "leave nothing behind but your footprints"* and *"take nothing except great memories",* but today this dictum is nothing but a muffled warning on Mount Everest.

…

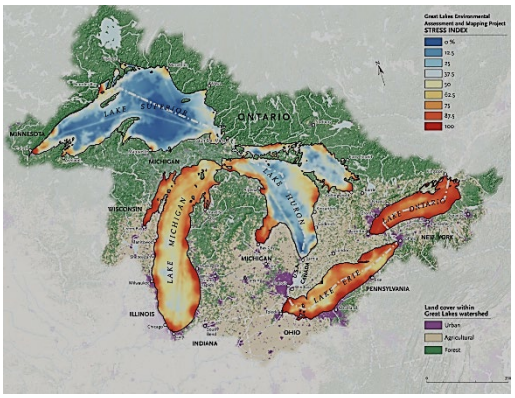
THE GREAT LAKES—ARE NOW "THE NORTH AMERICAN GARBAGE PATCH":

The Great Lakes represent one-fifth of the entire world's fresh surface water. Thirty percent of the Canadian population lives in the Great Lakes basin, as do 10 percent of Americans.

However, this fresh-water resource is endangered by plastic waste. As this garbage breaks down into microscopic bits, it becomes deadly to living species, and are found in even treated drinking water. More than 22 million pounds of plastic pollution end up in the Great Lakes every year, according to the Rochester Institute of Technology.

The area receives agricultural run-offs, especially phosphorous overspills, from farmland. This feeds a harmful algal bloom that contains a hazardous **cynobacteria**--that can make humans and animals sick. The infestation that is in the Great

[3] Sherpa, P (2020) "Mt. Everest the World's Highest Garbage Dump," *Scientific Scribbles.*

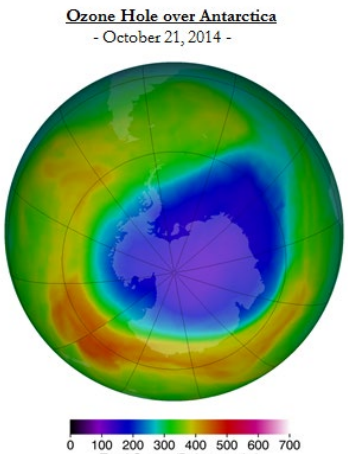


Lakes are less than 1 percent per year—comparatively slight relative to the total volume of water--nevertheless, contaminants are retained in the system and become more concentrated with time. (Image Left: maproomblog.com).

For more information about Pollution in th Great Lakes, see the documentary, *Great Lakes in Peril* by Jacob VanHouten, https://youtu.be/3suNIwuu3e0

…..

ANTARCTICA IS IN PERIL-- Human debris has befouled the once-unsullied polar region. Antarctica is a research area where global pollution can be studied because of the unspoiled natural environment that used to be. Today, however, even here plastic pollution has found its way inside. Marine debris from shipping vessels are increasingly hazardous to oceanic life forms. Fishing nets and lines, buoys, and tarpaulins have become a floating problem. Although most of the debris has fallen off ships and is not intentional, it poses significant long-term wicked problems. (Images: Above Left voanews.com; Above Right National Geographic; Below Left: antartica.gov.au). Tourism by air and ship have been on-going since the 1960s, bringing the footprint of humanity upon the land and water.



(NASA, 2014)

Recently, hiking, cross-country skiing, and camping trips are common. The available statistics from the International Association of Tourism Operators (IAATO) show visitor

figures for the 2019/20 season reveal that 74,401 visitors traveled with IAATO members to Antarctica between October 2019 and April 2020.

The **Antarctic Treaty System** (**ATS**),[4] protects waste disposal management in over 20,000,000 sq. kilometers of the Southern Ocean. Annex IV to this Protocol prohibits discharge of toxic substances such as oil, garbage, and other elements in this region. These also pose a contentious issues for international relations. (Image Left: Flag of the ATS). Some additional points are important:

- There are few unvisited places left on Earth. We have started to realize their enormous value to humanity.
- Environmental impacts in Antarctica occur at a range of scales. Global warming, ozone depletion and global contamination have planet-wide impacts.
- The Antarctic region is a sensitive indicator of global change.
- Biosecurity is an important part of managing the Antarctic environment. The risk of introducing new species, including disease-causing species, is of particular concern in Antarctica.

Reference: www.antarctica.gov.au/about-antarctica/environment/human-impacts-in-antarctica

……

WAYS OUT FROM WICKED WASTE MANAGEMENT PROBLEMS [5]:

Humanity's obligation to prevent, reduce, recycle and reuse and to appropriately manage urban solid waste and halve global food waste by 2030; and to properly handle and treat chemical and other hazardous waste through the whole life cycle in accordance with international standards is are targets within SDGs 11 and 12.

Minimizing waste generation and maximizing the recycling of waste is central to the concept of ***circular economy.*** (Images Above Right: dream/time.com; Left: lawprintpack.co.uk)

[4] An assemblage of agreements between countries came into being in 1959 with the passage of the Antarctic Treaty.
[5] Data sourced from United Nations, Sustainability Development Goals, #11 and #12.

The full text of Target 11.6 is "*By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management."*

The target has two indicators:

- **Indicator 11.6.1:** Proportion of municipal solid waste collected and managed in controlled facilities out of total municipal waste generated, by cities'
- **Indicator 11.6.2**: "Annual mean levels of fine particulate matter (e.g. $PM_{2.5}$ and PM_{10}) in cities (population weighted)"

The New Urban Agenda (NUA), vowed to achieve comprehensive ingress to sustainable waste management systems, minimizing landfills and converting waste into energy. (Image: urbact.eu)

There will be challenges to waste management systems from political, environmental, socio-economic, and technological, as waste management systems are inherently political, environmental, socio-economic, and technological, there may be challenges faced achieving indicator 11.6.1 as these factors create interrelated and dynamic inherited features.

The full text of Target 12.4 is: *"By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment."*

Target 12 has three indicators:

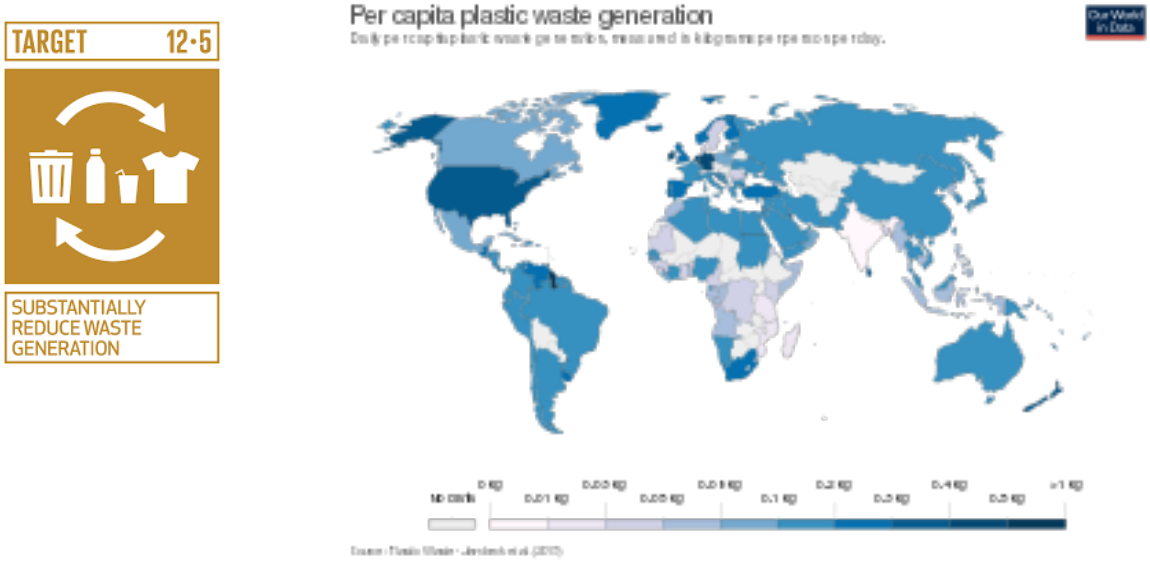
- **Indicator 12.4.1**: Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement
- **Indicator 12.4.2: (a)** Hazardous waste generated per capita; and **(b)** proportion of hazardous waste treated, by type of treatment.

- **Indicator 12.5.1** is the "National recycling rate, tons of material recycled".

The Indicator 12.4.1, doesn't measure the quantity or the impact on the health of chemicals. It is instead referred to as the number of countries that have ratified, accepted, approved or have accesses to one of the Multilateral Environmental Agreements[6].

In the case of the Indicator 12.4.2, it is referred to as the quantity of hazardous waste generated and treated. Many of these substances have a negative impact on people's health and the environment. However, they are also present in products that are used in our everyday life. Therefore, the challenge is to manage treating hazardous waste according to international standards. Currently, there is an increase in hazardous waste, that is intensified by the complexity of the products and the unidentified hazardous components. E-waste is a subcategory of this indicator. Global e-waste generation has grown during 2010 to 2019: from 5.3 kg per capita to 7.3 kg per capita. The environmentally sound recycling of e-waste also increased: from 0.8 kg per capita to 1.3 kg per capita.

Target 12.5: Substantially reduce waste generation



Per capita plastic waste generation, 2015

[6] Convention on Biodiversity and the Cartagena Protocol on Biosafety; Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal; Convention on International Trade in Endangered Species of Wild Fauna and Flora; Minamata Negotiations on Mercury; Montreal Protocol on Substances that Deplete the Ozone Layer; Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade; Stockholm Convention on Persistent Organic Pollutants; United Nations Environment Program (UNEP)

The full title of Target 12.5 is: "*By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse*."

Every year, about one third of all food produce goes bad. This is worth about $1 trillion a year. The food spoils mainly during transportation. *"Minimizing waste generation and maximizing the recycling of waste is central to the concept of* ***circular economy."*** This indicator measures the quantity of material recycled within the country, plus the material that is exported to be recycled abroad, minus the material that countries imported to be recycled inside the country per year. These three different aspects are defined as the National Recycling Rate. (Image: biomimicry.org).

……

And Now, *A Point to Ponder*

Researched and developed by Professor Emerita Breena E. Coates, bcoates@csusb.edu