2018 UPDATE ON THE WORLD'S DIMINISHING RESOURCES

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I. INTRODUCTION

The world is at present witnessing an accelerating pace of using up the planets precious resources which have existed over the past millions of years. The main reasons are twofold:

a) The effect of the forever increasing global warming year by year.
b) The pressure of human encroachment for the gain of agriculture, food and infrastructure such as the building of population needs etc etc.

In the end, it all comes to the phenomenon of global overpopulation as the world cannot support the existing population we have inextricably produced.

In this article, we shall list some of the major items some of which are irreversible while others may be fixed if we have the determination.

II. DEFORESTATION

Current deforestation trends point toward catastrophic and irreversible losses of biodiversity and runaway climate change. With better governance and smarter land use, it would be possible to meet global demand for food and forest products without any further loss of forests between now and 2030, but urgent action is needed.

Forests play a critical role in mitigating climate change because they act as a carbon sink—soaking up carbon dioxide that would otherwise be free in the atmosphere and contribute to ongoing changes in climate patterns. Deforestation undermines this important carbon sink function. It is estimated that 15% of all greenhouse gas emissions are the result of deforestation.

Forests cover 31% of the land area on our planet. Although the World Resource Institute maintain that only about 15% of the forest remain intact. the rest has been cleared, degraded or is in fragments, wiping out ecosystems and displacing indigenous communities. Forests produce vital oxygen and provide homes for people and wildlife. Many of the world's most threatened and endangered animals live in forests, and 1.6 billion people, or more than one quarter of the world's human population, rely on benefits forests offer, including food, fresh water, clothing, traditional medicine and shelter.

Deforestation is one of the single biggest phenomenon contributing to climate change. The most feasible solution to deforestation is to carefully manage forest resources by eliminating clear-cutting, to make sure forest environments remain intact. The cutting

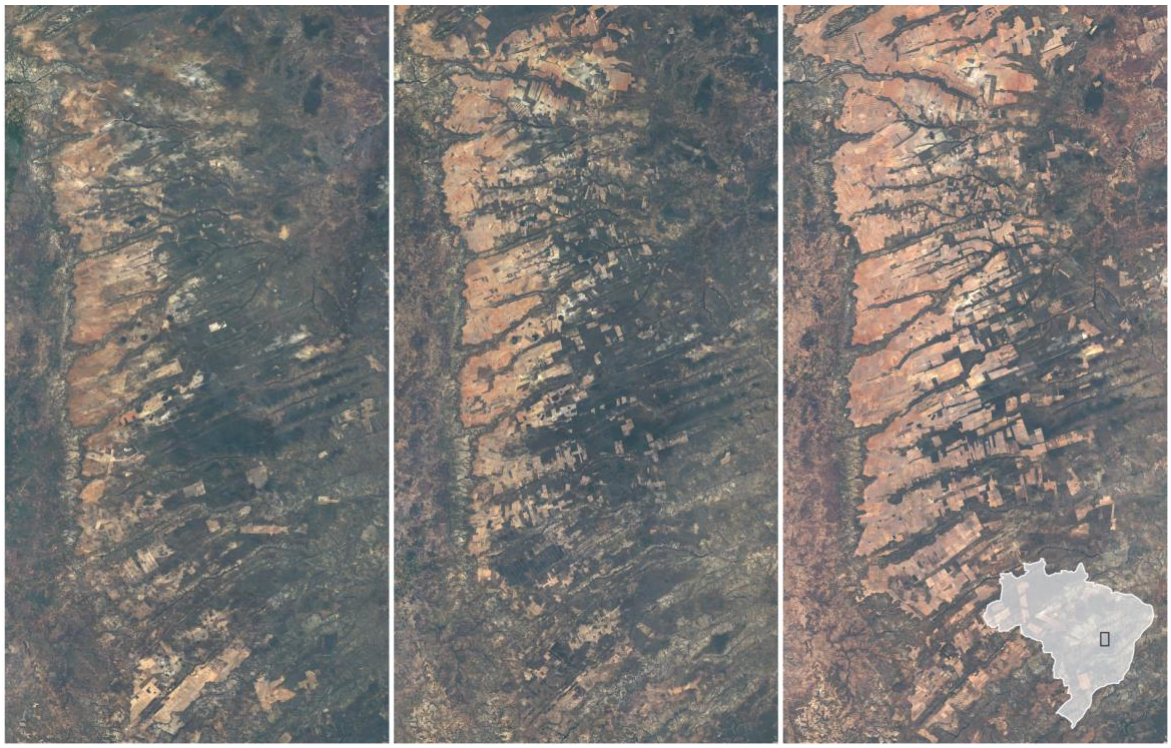
that does occur should be balanced by planting young trees to replace older trees felled. The number of new tree plantations is growing each year, but their total still equals a tiny fraction of the Earth's forested land.

Between 2000 and 2012, 2.3 million square kilometers of forests around the world were cut down. As a result of deforestation, only 6.2 million square kilometers remain of the original 16 million square kilometers of forest that formerly covered the planet. Deforestation comes in many forms, including fires, clear-cutting for agriculture, ranching and development, unsustainable logging for timber, and degradation due to climate change. This impacts people's livelihoods and threatens a wide range of plant and animal species. Some 119,000-150,000 square kilometers of forest are lost each year.

Although subsistence activities have dominated agriculture-driven deforestation in the tropics to date, large-scale commercial activities are playing an increasingly significant role. In the Amazon, industrial-scale cattle ranching and soybean production for world markets are increasingly important causes of deforestation, and in Indonesia, the conversion of tropical forest to commercial palm tree plantations to produce bio-fuels for export is a major cause of deforestation on Borneo and Sumatra.

The main culprit for this clearing of land are the big multinational agricultural companies in particular Cargill which is responding to the high demand of soya beans from China. Much high technology has been developed for tracking the whole chain from clearing to supply, storage, and shipment data using satellite and drones.

The Brazilian Amazons is the world's largest rain forest. In the decade after the "save the rainforest' movement forced changes that slowed down deforestation across the Amazons, Brazil has had a moratorium in 2006 on forest clearing for soy production and between 2006 and 2015 Brazil has reduced deforestation by almost 2/3, according to estimate by Mongabay.org. However, activity is now roaring back again. In 2015 deforestation rose for the first in nearly a decade to nearly 2 million acres (1 acre = 4047 sq meters = approximately 64 meters x 64 meters) from August 2015 to July 2016. This is to be compared with 1.5 million acres from the year before and 1.2 million acres before that, according to estimates by Brazil's National Institute for Space Research.



1984 2000 2016

Figure II.1 This is an aerial photo by the New York times for the area delineated in a little square in the map of Brazil on the right most picture.

Brazil's Ministry of the environment is very uncomfortable with the image of the rise in deforestation. However, at the same time it has cut its funding by half amid budget problems. The multinationals like Cargill is also trying to improve its image.

Over in Bolivia, the situation is worse because there are fewer restrictions on land clearance. There about 865,000 acres have been deforested annually for agriculture since 2011. It is driven by food security and the country has declared that it expects to clear almost 14 million more acres of forest by 2025, to convert into farmland.

The good news is that spurred by the action of the UN at the Climate Summit in 2014, there has been a New York Declaration on Forests. This is a none legally binding political declaration that grew out of dialogue among governments, companies and civil society. For the first time, world leaders endorse a global timeline to cut natural forest loss in half by 2020, and strive to end it by 2030 It also calls for restoring forests and croplands of an area larger than India. Meeting these goals would cut between 4.5 and 8.8 billion tons of carbon pollution every year –about as much as the current emissions of the United States. The Declaration is endorsed by dozens of governments, of the world's biggest companies, and [more than 50] influential civil society and indigenous organizations.

The Declaration will target eliminating deforestation of degraded forests and agricultural land that included the production of agricultural commodities like palm oil, soy and beef

products by 2020. Experts at the time said the deadline, laid out in the New York Declaration of Forests, would require companies to start straightaway to make their sourcing more sustainable. Later the deadline was moved to 2030. Even before the New York Declaration, Cargill has made significant efforts to buy palm oil sources only from land not linked to fresh deforestation. I suppose it is the least they can do!

To reach this target the world needs to annually restore 57 million acres. But at the moment the world is still deforesting and degrading 37 million acres annually.

And if we are to wait till 2030, there will be no forest left!

Desertification in Northern China

Lack of forests in the past and the climate change has led to the advance of Gobi Desert. Since 1975, china has lost 54,400 sq. km and it is in 2016 advancing at an annual rate of more than 3470 sq. km. In 2001, it was estimated that full-fledged deserts lie just 160 km from Beijing and are advancing at a rate towards Beijing of about 3 km a year. This has caused violent sandstorms in Beijing in 2017. Government is undertaking a reforestation project being called the Great Green Wall of tree planting.

HOW TO REGREEN THE FORESTS

In 2015, The World Resource Institute published six steps to regreening success. They are:

1. Identify and analyze existing regreening successes;

2. Build a grassroots movement for regreening;

3. Address policy and legal issues to enable conditions for rergreening;

4. Develop and implement a communications strategy;

5. Develop or strengthen agroforestry value chains; and

6. Expand research activities.

Tree planting in a cost effective way is the key. Beginning with the first item, 3 good examples of re-greening successes come to mind:

> (1) In Niger, farmers have built new agroforestry systems on 50,000 sq. kilometers in 20 years , which comes to be on average 2500 sq. kilometers annually. External funding costs were below $2000 per sq. kilometer. The main asset is that small farmers themselves protected and managed the natural regeneration of woody species of trees and shrubs on their farmland **a**nd by doing so they added 200 million new trees without costly external assistance for

tree-planting. These on-farm trees help increase crop yields, produce fodder for as well.

(2) Northern Ethiopia is now greener than it has ever been during the last 145 years. Here Local communities organized themselves to control livestock grazing and wood cutting on degraded plateaus and mountain slopes. This allowed vegetation to regenerate naturally. Together with this community labor invested in rainwater harvesting, alongside downstream development of irrigated agriculture. So landscapes have been completely transformed by grassroots restoration. This has helped small farmers and their communities diversify and increase crop production, secure water supplies and build resilience to drought.

(3) Costa Rica is another example of a country that has overcome a history of deforestation largely through assisted natural regeneration. Policy reforms reduced subsidies to farmers engaged in converting forests to pastures for livestock production, along with the recognition in Costa Rica of the economic benefits of forest restoration, helped to drive changes in land use. As forests have been restored, ecotourism has flourished which now provides significant economic incomes.

These 3 examples show the importance of smallholder farmers who are often the key private investors in tree-based restoration. What this depends on is that greater success in achieving ambitious forest restoration targets may well depend on mobilizing a "restoration movement" of millions of smallholders in ways that both enable lower-cost restoration and encourages behavior changes that address root causes.

III. BIODIVERSITY

Oh what a wonderful planet we have inherited and nature is unbelievably beautiful!! There are millions and millions of species on earth, It is impossible to catalogue them all but so far scientists have identified about 1.75 million different species. That includes 950,000 species of insects, 270,000 species of plants, 19,000 species of fish, 9,000 species of birds, and 4,000 species of mammals.

Why do we need so many species? Because we are all part of our ecosystem and all species are interconnected and depend on each other. Forests provide homes for animals. Animals need plants to eat. The plants need healthy environment to grow and they provide food, shade, construction material, medicine and fiber for clothing and paper, etc. Two main reasons why more biodiversity is better:

Powerful Pollinators: Bees, birds, and other creatures pollinate 75 percent of the world's major crops. In areas with lots of biodiversity, insects and other creatures pollinate plants naturally. When biodiversity is low, farmers have to introduce large quantities of such as honeybees to pollinate their commercial crops.

Medicine from Nature: About 25 percent of the medicines used today are taken from or modeled on chemicals found in plants, animals, or other living things. Much advance in genetic engineering in the form of the latest diagnostic tools like CRISPR provide new opportunities for accessing naturally occurring RNA - DNA molecules that can hold clues to new medicines.

Yet, it is a sad fact that our planet is now in the midst of its sixth mass extinction of plants and animals — the 6th wave of extinctions in the past half-billion years. We're facing the worst die-offs of species since the loss of the dinosaurs 65 million years ago. Although extinction is a natural phenomenon, it happens at a natural "background" rate of about one to five species per year. However, it is estimated that we're now losing species at 1,000 to 10,000 times the background rate, with literally tens of species going extinct every day.

In fact, the Living Planet Index shows a decline in biodiversity of 52% between 1970 and 2010. To put it more starkly: 1 in 5 species now face extinction and that will rise to 50% by the end of this century. This means that as many as 30 to 50 percent of all species possibly heading toward extinction by 2050.

The sad thing is: whereas past mass extinctions were caused by natural phenomenon like asteroid strikes, volcanic eruptions and natural climate shifts, the current crisis is almost completely caused by humans. Population growth is the basic reason for this. The ever increasing number of mouths to feed has led to our industrial agriculture with human encroachment on the lives of all species. Our activities have caused:

1) Habitat loss - forests and wetlands being cleared to build houses and agriculture;

2) Introduction of exotic strange species into local ecosystems;

3) Pollution, overfishing and overhunting disturbing the natural balance of species in a local ecosystem; and

4) Global warming changing the temperature and climate of the environment.

In fact, 99 percent of currently threatened species are at risk from human activities Ecosystems are complex and the extinction of one species is likely to lead to changes in other species which can lead to other extinctions. So the effect can be easily amplified.

Biodiversity is closely connected to deforestation since 80% of Earth's land animals and plants live in forests. In fact, biodiversity is the highest in tropical regions and as we go up in latitude and temperature decreases there is less biodiversity. The reason we need maximum diversity of species is because this ensures ecosystem resilience which ensures it can withstand stress. All the species in a local ecosystem are interrelated, and when one species becomes extinct, other species through genetic mutations and other behavior means adapt to reach a new balance. In time, new species may evolve. But this time scale may be long.

No one really knows how many species are in danger of becoming extinct. We do know that in the past 500 years, approximately 1000 species have gone extinct. Conservation scientists in the US estimate that there are 14,000 to 35,000 endangered species, which is 7 to 18% of all flora and fauna. Worldwide, it is assessed that 17,000 species are threatened with extinction.

Here, I quote a forceful statement by Paul Ehrlich, a noted environmentalist at Stanford University who initiated MAHB - Millennium Assessment of Human Behavior. (see article “MAHB - A DISCUSSION FORUM TO DISSEMINATE IDEAS ON HOW TO IMPROVE OUR ENVIRONMENT” by PAUL EHRLICH AND GIOIETTA KUO on ‘World Environment’ Oct. 2012):

> *“Rich western countries are now siphoning up the planet’s resources and destroying its ecosystems at an unprecedented rate. We want to build highways across the Serengeti to get more rare earth minerals for our cellphones. We grab all the fish from the sea, wreck the coral reefs and put carbon dioxide into the atmosphere. We have triggered a major extinction event. The question is: how do we stop it?”*

Below I take a closer look at biodiversity loss among certain classes of animals and plants.

Mammals

Interest in biodiversity loss is often first piqued by our emotional connection and thoughts often go to other mammals and our close ape relatives. Looking at the apes from an evolutionary point of view, they are our immediate predecessors and their disappearance would deprive us of this vital link in the understanding of how we humans evolved. The gene sequence of the chimpanzee has been decoded and compared with that of humans. It is interesting to note that the DNA differences between humans and chimpanzees is around 4%. To put this in perspective, the number of genetic differences between a human and a chimpanzee is about 10 times more than between any two humans. Human and chimpanzee DNA is so similar because the two species are so closely related with humans, chimpanzee and bonobos all being descendants from a single ancestor species that lived six or seven million years ago. As human and chimpanzee gradually evolved from a common ancestor their DNA passed from generation to generation, changed too. We do not quite understand the specific differences like humans having 3 times larger brain size, complex language skills and walking on 2 feet.

Figure III.2. A photo of an ape –Chimpanzee. Ah, the great apes are so much like us the humans. Look at the intelligence radiating in the eyes of this chimpanzee!
Image by Ronald Woan, Kibale National Park Chimpanzee Habituation Experience | Flickr | CC BY-NC 2.0

The International Union for Conservation of Nature, IUCN, estimates that almost 50% of the world's primate species are at risk of extinction. All great ape species –gorilla, chimpanzee, bonobo and orangutan– are classified as either Endangered or Critically Endangered. The main threats are human encroachment through industrial agriculture on their forest habitats, also poaching for meat, disease –including Ebola, and the pet trade. All great apes live in tropical forests, which are fast disappearing.

Overall IUCN estimates that half the globe's 5,491 known mammals are declining in population and a fifth are clearly at risk of disappearing forever with no less than 1,131 mammals across the globe classified as endangered, threatened, or vulnerable. In addition to primates, marine mammals — including several species of whales, dolphins, and porpoises — are among those mammals slipping most quickly toward extinction.

How can we allow this to happen? We should be ashamed! What will the future generations say about us for not being able to see these beautiful creatures in nature? First we need the collaboration of the government, the private sector, local communities and civil society to work out and integrate a plan to reconcile some of the conflicting agendas for the protection of mammals as well as the wellbeing of the human population. Given that tropical forest loss is a significant contribution to climate change, the conservation of these resources is critical to protecting not only the great ape, but also other plants and animals, and the global human population.

Birds

Birds occur in nearly every habitat on the planet and are often the most visible and familiar wildlife to people across the globe. As such, they provide an important bellwether for tracking changes to the biosphere. Declining bird populations across habitats confirm that profound changes are occurring on our planet in response to human activities.

A 2009 report on the state of birds in the United States found that 251 (31%) of the 800 species in the country are of conservation concern. Globally, BirdLife International estimates that 12% of the known 9,865 bird species are now considered threatened, with 192 species, or 2%, facing an "extremely high risk" of extinction in the wild — two more species than in 2008. Again, habitat loss and degradation have caused most of the bird declines.

Reptiles

Globally, 21% of the total evaluated reptiles in the world are deemed endangered or vulnerable to extinction by the IUCN — 594 species — while in the United States, 32 reptile species are at risk, about 9% of the total. Island reptile species haves suffered most, with at least 28 island reptiles having died out since 1600. But scientists say that island-style extinctions are creeping onto the mainland as human activities fragment continental habitats, creating "virtual islands" as they isolate species from one another, preventing interbreeding and hindering populations' health. The main threats to reptiles are habitat destruction and the invasion of non-native species that prey on reptiles and compete with them for habitat and food.

Amphibians

Amphibians include various species of frogs and salamanders. They are one of the main links in many ecosystem food webs. Often unseen, they can be quite abundant in some habitats. In temperate and tropical regions, amphibian can exceed all other terrestrial vertebrates such as birds, mammals, and reptiles. Amphibians including their larvae are important predators of invertebrates. Removal of amphibians from particular habitat can have drastic consequence by increasing insect populations. Through metamorphosis, many species of frogs and salamanders are a link of transfer of nutrient from aquatic systems to terrestrial ones. Therefore, removing amphibians from a particular habitat can affect drastically algae communities, invertebrate populations, predator dynamics, leaf litter decompositions, and nutrient cycling. Preserving amphibian diversity is an important component for living in a healthy environment.

Addressing the amphibian extinction crisis represents the greatest species conservation challenge in the history of humanity. One third to one half of all amphibian species are threatened with extinction, with probably more than 120 already gone in recent years. These declines are known as one of the most critical threats to global diversity and

several causes are believed to be involved, including disease, habitat destruction and modification, exploitation, pollution, pesticide use, introduced species and ultraviolet-B radiation.

Fish

Increasing demand for water, the damming of rivers throughout the world, the dumping and accumulation of various pollutants, and invasive species make aquatic ecosystems some of the most threatened on the planet; thus, it's not surprising that there are many fish species that are endangered in both freshwater and marine habitats.

The American Fisheries Society identified 700 species of freshwater or anadromous fish in North America as being imperiled, amounting to 39 percent of all such fish on the continent. In North American marine waters, at least 82 fish species are imperiled. Across the globe, 1,851 species of fish — 21 percent of all fish species evaluated — were deemed at risk of extinction by the IUCN in 2010, including more than a third of sharks and rays.

What is most important for human society is the diminishing supply of food for the growing overpopulation.

Invertebrates

Invertebrates are estimated to account for about 97% of the total species of animals on Earth though no one knows just how many invertebrate species exist. Invertebrates, from butterflies to mollusks to earthworms to corals, are vastly diverse. Of the 1.3 million known invertebrate species, the IUCN has evaluated about 9,526 species, with about 30% of the species evaluated at risk of extinction. Freshwater invertebrates are severely threatened by water pollution, groundwater withdrawal, and water projects, while a large number of invertebrates of notable scientific significance have become either endangered or extinct due to deforestation, especially because of the rapid destruction of tropical rainforests.

In the ocean, we are very much aware of the beauty of coral reefs in The Great Barrier Reef of Australia and Raja Ampat of Indonesia and those in the Caribbean. As the temperature of marine waters increases, stressed corals expel their algae resulting in coral bleaching. These reef-building corals are declining at an alarming rate. The first-ever comprehensive global assessment of these animals in 2008 revealed that a third of reef-building corals are threatened. What is at stake is that though these reefs only take up about 1% of the ocean floor, they host about 25% of all ocean species! They provide complex, three-dimensional habitat for a huge variety of plants and animals (large and small!) and protect many young fish species as they grow. They are vital to the world's fisheries and food systems. Ocean acidification, resulting from increased atmospheric CO_2 being absorbed by the ocean, also poses a serious threat to marine biodiversity.

Figure III.3: Left, A healthy coral of Egypt's Port Ghalib. Image by J. Hutsch, 2006| Wikimedia Commons | CC BY-SA 2.5; **Right,** A part of Moofushi's bleached coral reef of the Maldives' Alifu Dhallu Atoll. Image by Bruno de Giusti, 2006 | Wikimedia Commons | CC BY-SA 2.5

Plants

Through photosynthesis, plants provide the oxygen we breathe and the food we eat and are thus the foundation of most life on Earth. They're also the source of a majority of medicines in use today. Of the more than 300,000 known species of plants, the IUCN has evaluated only 12,914 species. Its finding is that about 68 percent of evaluated plant species are threatened with extinction.

Unlike animals, plants can't readily move as their habitat is destroyed, making them particularly vulnerable to extinction. Indeed, one study found that habitat destruction leads to an "extinction debt," whereby plants that appear dominant will disappear over time because they aren't able to disperse to new habitat patches. Global warming is likely to substantially exacerbate this problem. Already, scientists say, warming temperatures are causing quick and dramatic changes in the range and distribution of plants around the world. With plants making up the backbone of ecosystems and the base of the food chain, that's very bad news for *all* species, which depend on plants for food, shelter, and survival.

Rise in global temperature is impacting on our agriculture as the growing moves to higher latitudes.

IV. MELTING ICE AND SEA LEVEL RISE

NASA has reported some very recent data from its GRACE satellite as well as from drones and ice bore into the bottom layers of the kilometers thick ice sheets. It finds accelerating ice melt on the world's largest ice sheets – Greenland and Antarctic. Why should we be so concerned about it? It is because their melting is the main contributor to global sea level rise. The average global sea levels is already 82 mm above the 1993

average and is continuing to rise at the rate of around 3 mm/year. In addition to the ice melting the sea level rises because of the thermal expansion of yearly warming seas due to climate change. As both effects show no sign of abating, they pose an increasing existential threat to the world's coastal cities. In the US, 40% of population lives in relatively high population density coastal areas, where sea level affects flooding, shoreline erosion and hazards from storms. According to UN Atlas of the Oceans, 8 of the worlds' 10 largest cities are near a coast. Notably this includes the metropolitan areas of New York, London and Shanghai.

In February 2018, NASA published the latest data from their most recent extensive satellite results finding that sea level rise is accelerating and the estimate is that it will be a staggering 65 cm by 2100: New study finds sea level rise accelerating – NASA Climate Change

Melting Ice

The largest ice covers on our planet are in Antarctic and Greenland. With the relentless increase in global temperatures year by year, these are melting very fast.

(1) Greenland Ice Melt

In Greenland, ice occupies 1.7 million sq km or about 82% of the island's surface, and exceeds 3 kilometers at its thickest point. If it melted completely it would cause sea levels to rise by 7.2 meters. Based on extensive data from NASA, including satellite, drones and ice bores of the ice sheet's bottom layers, it has been found that the ice sheet has shed on average more than 303 gigatons (billion metric tons) of ice per year since 2004. With every successive year the loss has increased by 31 gigatons. About 60% of this melt is due to surface melting and the rest is caused by calving of glaciers into rivers and the sea.

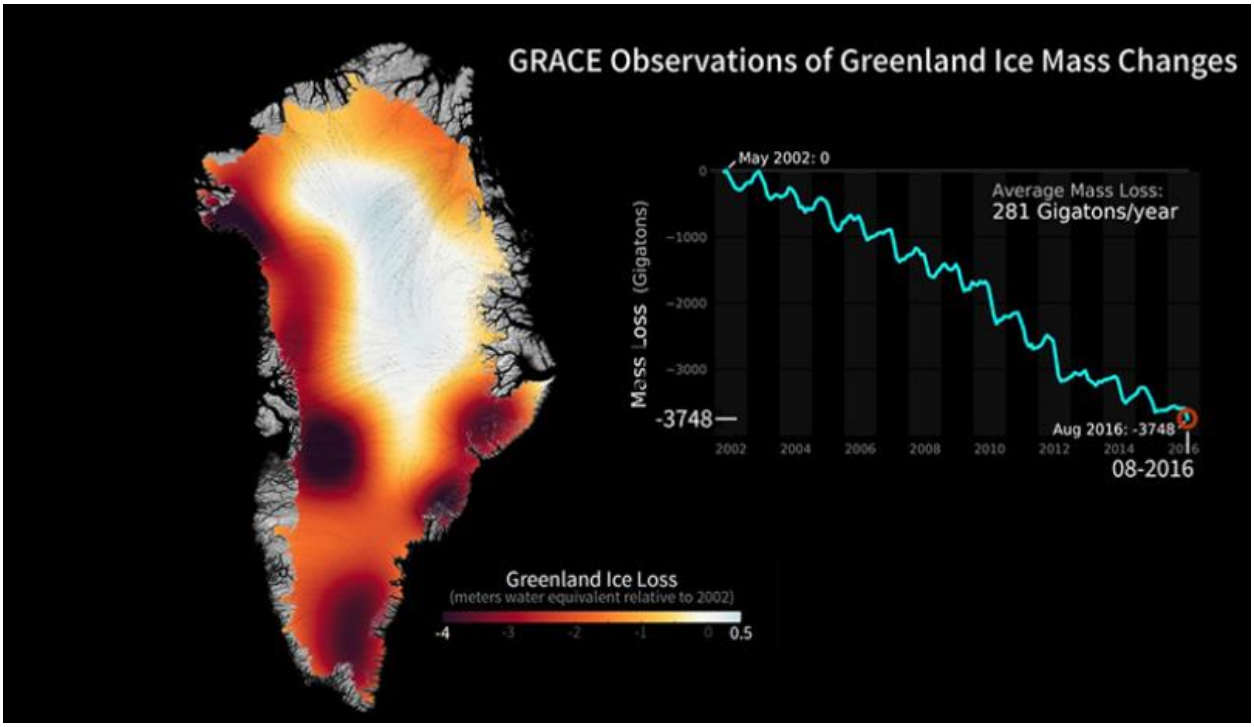


Figure IV.4 GRACE satellite observation of Greenland ice melt from 2002 to August 2016 (marked by a red dot).

The amount of Greenland's ice loss for August 2016, the last data available, is shown in Figure 4 on the colored map as meters water equivalent relative to 2002. The light grey color on the extreme right is 0.5 whereas the dark red on the extreme left is -4. The graph on the right is repeated below in Figure 2 with a red dot marking August 2016.

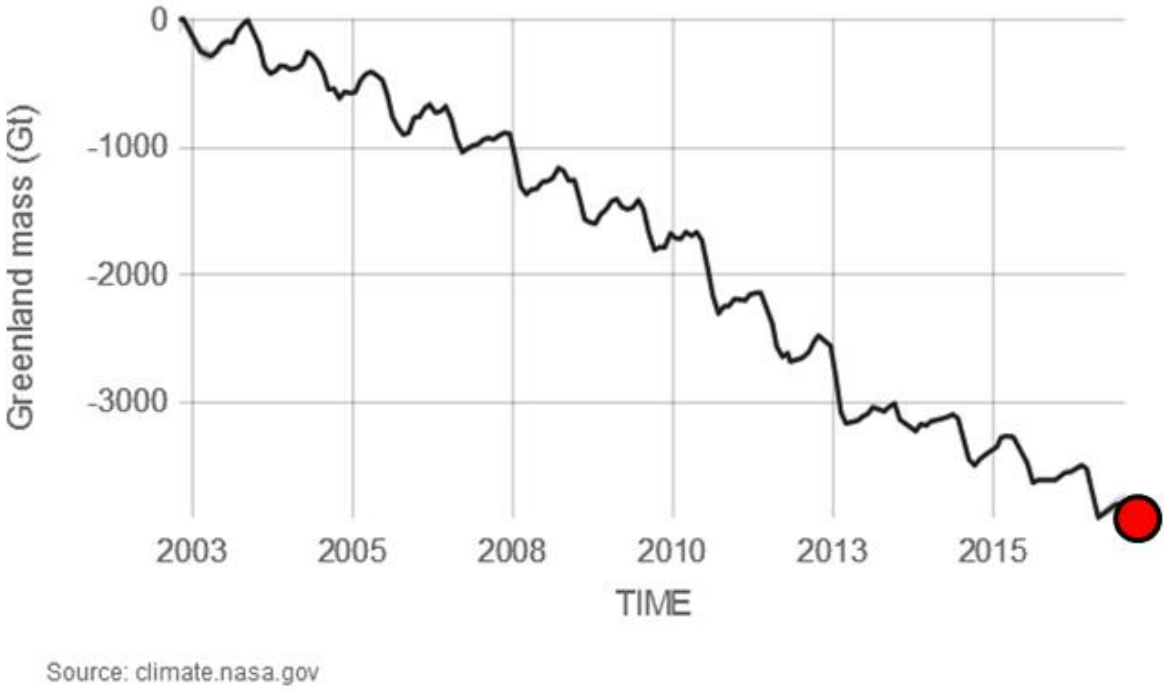


Figure IV.5. Overview of conditions from recent NASA GRACE satellite data on Greenland ice melt. From: Climate Change: Vital Signs of the Planet: Land Ice

From figure 5 it is possible to deduce this table:

Table IV.A: Greenland mass variation 2002-2017

Year	Ice Loss, gigatons
2002	-0
2004	-350
2006	-750
2008	-1030
2010	-1760
2012	-2650
2014	-3150
2016	-3650
2016 (August)	-3750

The rate of change is on average -286 gigatons/year with a margin of ±21. Although the last 5 years have shown a slower rate of loss.

(2) Antarctic Ice Melt

The Antarctic ice sheet is the largest single mass of ice on earth. It contains 30 million cubic kilometers of ice, which is around 90% of the Earth's ice mass. It covers an area of almost 14 million sq km which, if melted, would cause sea levels to rise by 58 meters. So far the temperature at Antarctic is rising more quickly than the global average, and it is losing about 118 gigatons of ice per year since 2002.

The latest news is that miles of ice is collapsing into the sea and that we have passed the point of no return.

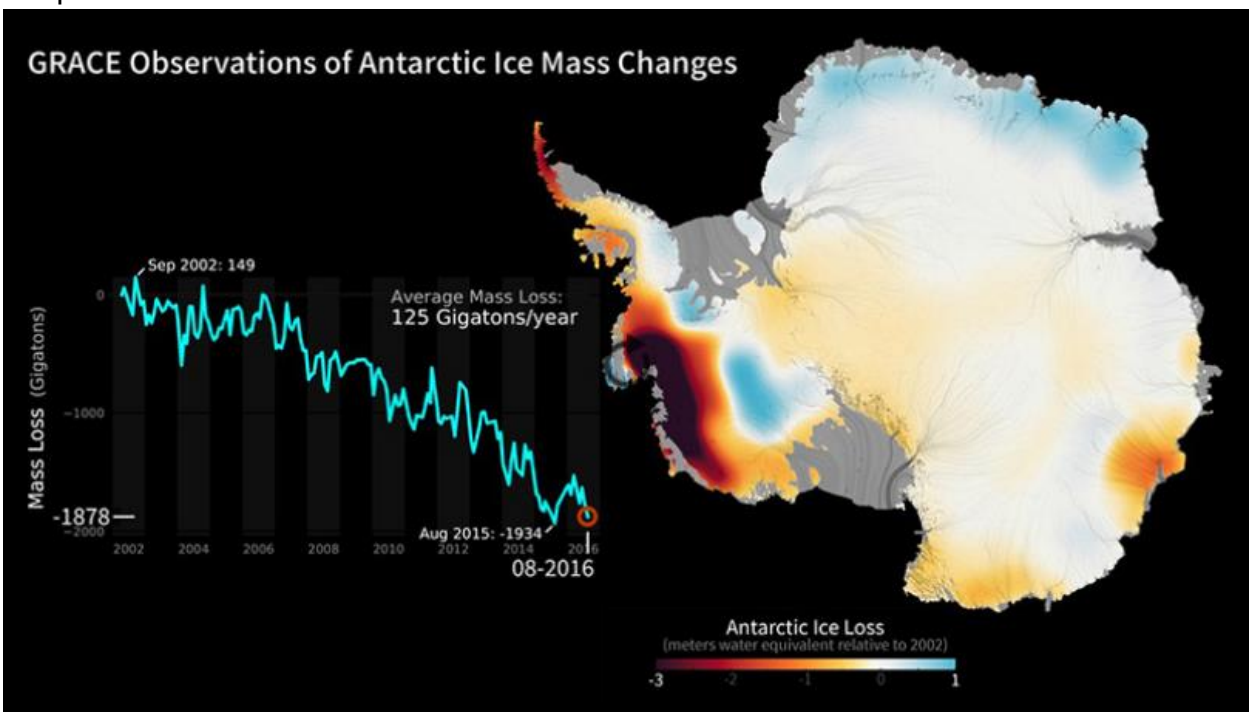


Figure IV.6 GRACE satellite observation of Antarctic ice melt from 2002 to August 2016 (marked by a red dot).

The amount of Antartica's ice loss in August 2016 is shown in Figure 6, again as a colored map representing meters water equivalent relative to 2002. The light grey color on the extreme right is 1 whereas the dark red on the extreme left is -3. Figure 7 repeats the graph that appears on the left.

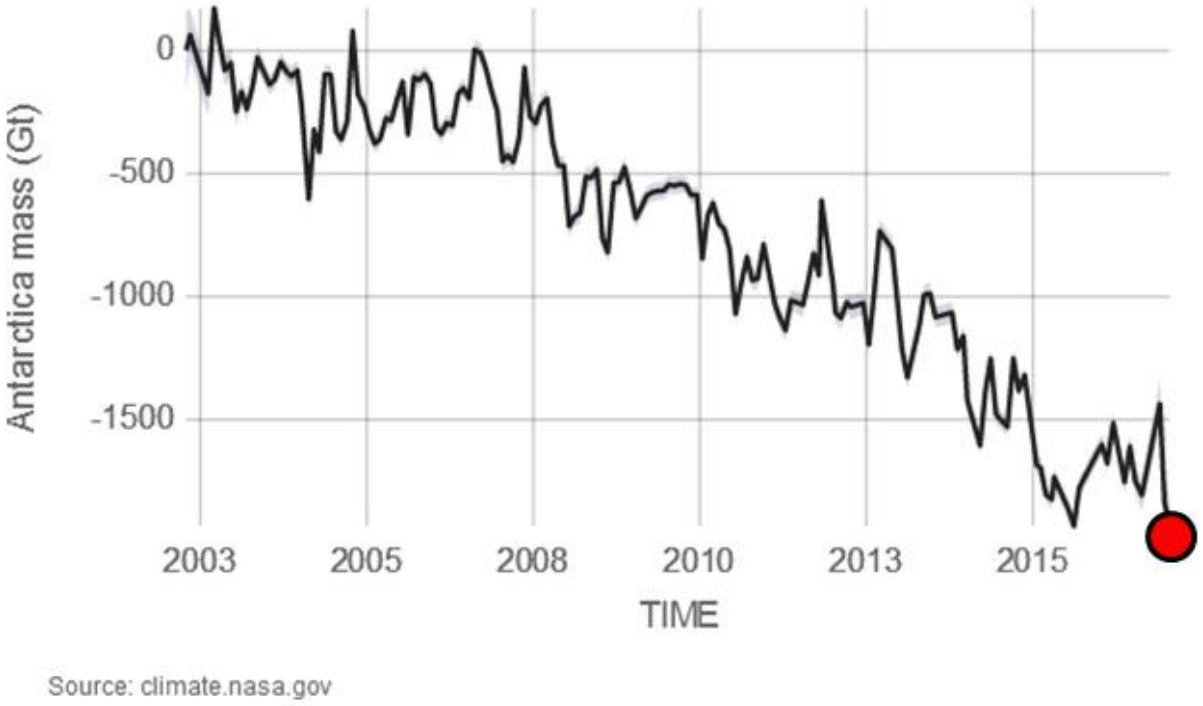


Figure IV.7: Overview of conditions from recent NASA GRACE satellite data on Antarctic ice melt. From: Climate Change: Vital Signs of the Planet: Land Ice

From Figure 7 it is possible to deduce this table:

Table IV.B: Antarctic ice mass variation 2002-2017

Year	Ice Loss, gigatons
2002	-0
2004	-500
2006	-450
2008	-700
2010	-800
2012	-1030
2014	-1650
2016	-1680
2016 (August)	-2000

The rate of change is on average -127 gigatons/year with margin of ±30. Although the last 10 years have shown a faster rate of loss.

Sea Level Rise

Global mean sea level rise is caused by an increase in the volume of the ocean and this is a result of:

1) Warming of the ocean through thermal expansion.

2) Loss of ice by glaciers and ice sheets in Greenland and Antarctica.

3) Reduction of liquid water storage on land and the flowing of rivers.

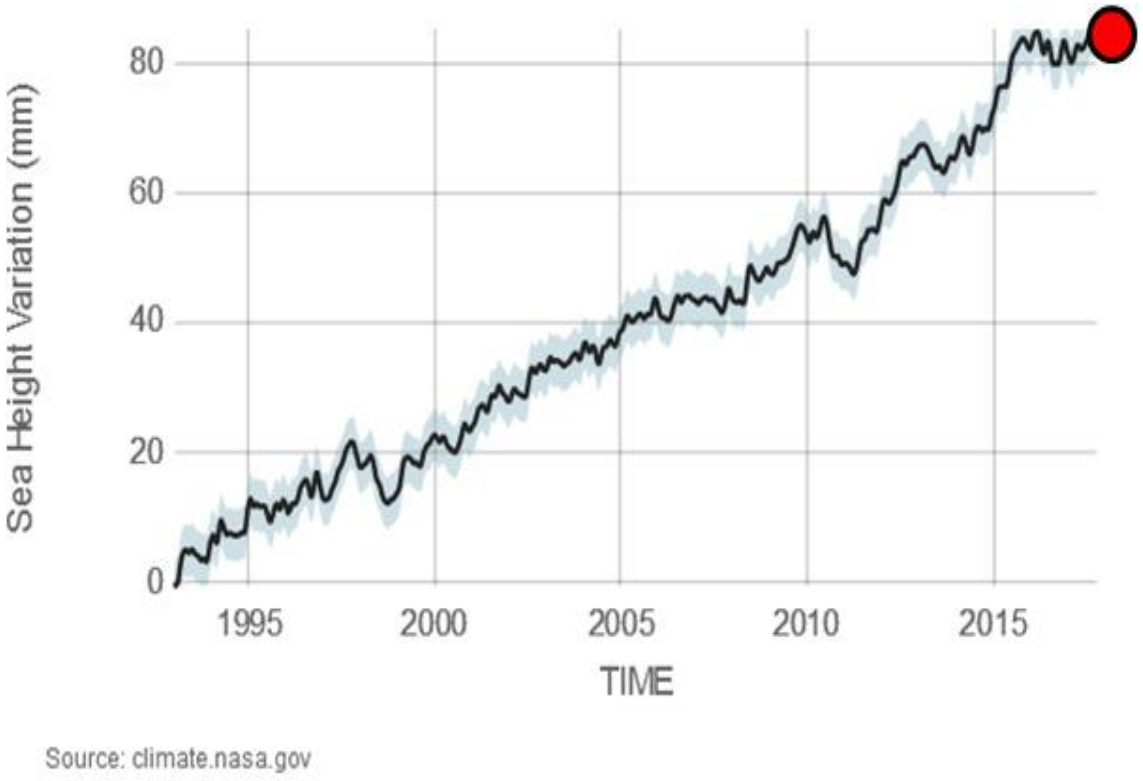


Figure IV.8: Variation in sea height over time from 1993-November 2017. From: Climate Change: Vital Signs of the Planet: Sea Level

Very approximately, NASA satellite data give the following table:

Table IV.C: Annual Global Sea Level Rise

Year	Global sea level rise in (mm)

1990	0
1995	12
2000	21
2005	40
2010	53
2015	74
2017	81

On average the rate of rise is 3.2 mm/year with margin ±0.4 mm. However, IPCC gives an average sea level rise between 1992-2011 to be about 0.74 mm/year. The IPCC's long range forecast, which depends on the assumed rate of sea level rise, ranges from a 45 mm to 75 mm rise in sea level by 2100. Many of the world's largest cities, which are home to millions of people are threatened by this rise. In particular New York, London, parts of Florida and Shanghai where the Yangtze River delta is very broad and shallow.

V. CONCLUSION

The sad fact is if even if we follow through with the Paris Accord of 2015 to keep the rise in global temperature below 2 degrees C by 2100, the effects of sea level rise will still be with us. Scientist at Potsdam Institute have found by modeling that for every five years climate forcing emissions are not reduced –as is happening at present– between 2020 and 2035, we could experience an additional 20 centimeters of sea level rise.

We cannot conclude without showing this harrowing picture of the polar bear family stranded of a piece of melting ice in the Arctic. Here the polar bear has to swim much further to find food.

Figure V.9 Stranded polar bear family on arctic ice melt.

This single picture sums all the proceeding words we have used to describe how humans are using up our resources and causing distress to animals and plants. This is happening at a very fast rate. The sea level rise we are already observing does not auger well for the future of many metropolitan areas worldwide in particular London, New York, and Shanghai. Will it destroy our civilization? Recently Paul Ehrlich, an eminent biologist with whom I have published an article in World Environment in 2012, stated: “Collapse of civilization is a near certainty within decades.” This is due to global overpopulation and overconsumption of our natural resources. What human society is doing at present is unsustainable. It is time we wake up and reverse our course?

Gioietta Kuo, MA at Cambridge, PhD in nuclear physics, Atlas Fellow at St Hilda’s College, Oxford and Princeton University plasma physics lab, is a research physicist. Over 70 professional articles and over 100 articles in environmental problems - in World Future Society-wfs.org, amcips.org, MAHB Stanford and other worldwide think tanks. Also in Chinese in ‘ People’s Daily’ and ‘World Environment’ - Magazine of the Chinese Ministry of Environmental Protection, and others in China. She can be reached at <kuopet@comcast.net.>