

Effects of Climate Change on South Asia: A Threat to National and Global Security

By: Stanley Farkas, PhD, Gary Latshaw, PhD, Philip Russell, PhD. July 2017 (Updated Aug 2017)

Executive Summary

The Department of Defense recognizes the reality of climate change and the significant risk it poses to U.S. interests globally. The resulting rise in global temperatures and sea level impacts crop production, fisheries, energy production, and water resources, enhances frequency and severity of storms, exacerbates health issues, and contributes to mass migration both internally and across international borders. South Asia (India, Pakistan and Bangladesh) is one of the most critical hot spots in the world as being highly impacted by climate change. Migration, especially from the coastal, and delta river basins and surrounding areas, would be of major concern with millions from Pakistan and Bangladesh migrating inland and also crossing or attempting to cross into India.

Migration policies and resource allocation agreements and migration policies in South Asia are not comprehensive enough to deal with these added impacts of climate change. Both Pakistan and India are nuclear states each with over 100 well-tested nuclear weapons. The potential for a major nuclear conflict between India and Pakistan, also entangling Bangladesh, over migration and resources could multiply. A regional war between these countries would have extremely serious political, humanitarian, and planetary consequences on the global scale. In the past, plans and decision making for US agencies, including DoD, have included the factor of climate change to deal with the domestic and international consequences of climate change. However, and without rationale, the current administration has prohibited US Government agencies from including climate change in their planning and decision-making, compromising the US leadership and capability to defuse the likelihood of threat to our nation and global security.

Introduction

“DoD recognizes the reality of climate change and the significant risk it poses to U.S. interests globally”.¹ The National Security Strategy, issued by the White House in February 2015, states that “climate change is an urgent and growing threat to our national security, contributing to increased natural disasters, refugee flows, and conflicts over basic resources like food and water”.² DoD considers these effects from climate change to be threat multipliers that aggravate stressors abroad such as poverty, environmental degradation, political instability, and social tensions – conditions that can enable terrorist activity and other forms of violence”.³ These impacts from climate change are already occurring globally, and “the scope, scale, and intensity of these impacts are projected to increase over time.”¹ Secretary of Defense General James Mattis states that “climate change is a challenge that requires a broader, whole-of government response” and that he “will ensure that the Department of Defense plays its appropriate role within such a response by addressing national security aspects.”⁴

This report specifically addresses (a) the harmful effects of climate change on South Asia (Bangladesh, Pakistan, India – refer to map attached), one of the most critical hot spots in the world that will be highly impacted by climate change, and (b) the region’s potential of becoming a threat to US and global security. Without rationale, the current administration has prohibited US Government agencies from including climate change in their planning and decision-making.⁵ This restriction is a major setback for the ability of agencies to plan

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for and take proactive action required to support nations that are vulnerable to the effects of climate change; in short, it compromises the US capability to defuse the likelihood of threat to our nation and global security. The DoD, Department of State, and other US agencies must have the authority and capability to plan, provide the infrastructure and implement real time technical, economic, defense and humanitarian aid to support climate-vulnerable nations - in South Asia and elsewhere.

Effects of Climate Change on South Asia- The Process

Refer to flow process attached.

Contributing Factors of Climate Change

The dominant cause of current climate change is the increase in atmospheric greenhouse gases (primarily CO₂ and methane), directly driven by human burning of fossil fuels (coal, oil, and natural gas).⁶ Natural factors also contribute to climate change; these include solar output, volcanic emissions, ocean circulation, methane, and Earth orbital parameters. But since the industrial revolution (~1850), these factors are secondary in importance to human-produced greenhouse gases.

The increase in atmospheric CO₂ acidifies the ocean, while the increases in all greenhouse gases warm the ocean, land surface, and lower atmosphere. This warming leads to melting of glaciers and snow pack, along with increasing the sea level, extreme weather patterns, droughts, and flooding. Approximately 15% to 40% of CO₂ can remain in the atmosphere for up to 1000 years and the effects on climate can persist for centuries.^{6 7}

Expected Temperature Rise by 2100

Following military risk assessment practices (chance of 7.2°F or 4°C rise in temperature being likely and the resulting consequences being high) this report will use the “business as usual” scenario of a global average surface temperature rise of at least 7.2°F by the year 2100.

If we continue business as usual without reducing the amount of CO₂ going into the atmosphere, the global average surface temperature is projected to have a 40% chance of being 7.2°F higher than the pre-industrial age value by the year 2100,⁸ the year most climate change studies use as a milestone. Beyond 2100, temperature is projected to continue to rise after. If all the signing nations of the Paris Accord are indeed in compliance, then the global average surface temperature is expected to rise around 5.4°F by year 2100, and yet still continue to rise after that. To stabilize the global average surface temperature increase at 3.6°F, then an immediate and aggressive mitigation approach must be implemented to reduce further addition of CO₂ to the atmosphere.^{8 9 10}

At the writing of this report, the United States has opted-out of its promised obligation to abide by the Paris Accord, and has, by Presidential Executive Order, re-implemented the burning of coal as an energy source, which will add to levels of atmospheric CO₂.⁵ In

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addition, the administration is attempting to roll back EPA methane regulations thus allowing leakage and burning of methane (84X more potent than CO₂) at drilling and power plants.¹¹ The future strength and results of the Paris Accord are unknown since the US no longer acts in a leadership role as formerly agreed. China is now in the process of filling the role as the global leader in climate change.

Expected Sea Level Rise by 2100

Sea level rise is caused by thermal expansion as the sea water temperature increases. Adding to this increase is the melt water and calving from glacial and terrestrial ice sheets flowing into oceans.¹² Sea level rise is not uniform along all coast lines but differs locally due to variances in ocean density, ocean circulation changes, and variations in the gravitational pull from ice masses at the poles.¹³ Due to these variations one coastal area of sea level may rise by more than the global average while another one declines.¹⁴

The effects of sea level rise as reported by a multi-agency study¹⁵ are based on a world average range of between 0.7 ft to 7 ft with an intermediate rise of 3.3 ft (1 meter) by the year 2100.

South Asia: General Features

Bangladesh

- Population: 8th most populous country in the world at 161M; 12th in density 3,123 / square mile — most land is sparsely occupied with one-fourth of the population living in the high-density coastal area.^{16 17 18}
- Geography: Total area – 56,977 square miles; 47% Cultivated.¹⁹ Mostly consists of low and flat land. More than 30% (7,657,721 acres) of the cultivated land is in the coastal areas. Except for a 169 miles border in the south east with Myanmar, it is completely surrounded by India. Bangladesh contains the largest river delta basin in the world from the confluence of the Ganges and Brahmaputra rivers,²⁰ whose sources are the glacier and snow pack melt of the Himalayas²¹ and the Meghna river whose source is from the mountains of eastern India. This river basin (Ganges-Brahmaputra-Meghna Basin) and the surrounding area make up a vast river plain, containing 2/3 of the land of Bangladesh and less than 16 ft above sea level.^{21 22}
- Economic Development: Ranks low on just about all measures of economic development. Over 35% of Bangladeshis' suffer from malnutrition.²¹
- Food Staples: Rice (primary), wheat, maize¹⁷
- Political Stability: Ranked 21st from the bottom of 194 countries for political stability.²³

Pakistan

- Population: 6th most populous country in the world at 201M; 54th in density 614 / square mile.¹⁶ and like Bangladesh with most land being sparsely occupied and large numbers of the population living in the high-density coastal area and major cities.
- Geography: Total area – 307,373 square miles; 47% Cultivated. Mostly hot, dry arid desert. Temperate in northwest; arctic in north. Prone to recurring large-scale floods, earthquakes, droughts and landslides.^{24 25 19} Pakistan's largest city,

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Karachi (27.5M), is located on the coast and is highly vulnerable to the effects of climate change.

- Economic Development: 30% (~ 57M) below poverty line; high rates of malnutrition and food insecurity persist. ^{24 25}
- Food Staples: wheat (primary staple), legumes, rice, maize. ¹⁷
- Political Stability: Ranked 3rd from the bottom for political stability; just above Syria and Yemen. ²⁶

India

- Population: 2nd most populous country in the world at 1.31B; 28th in density 1014 / square mile. ¹⁸
- Geography: Total area is 1,269,219 square miles; 60% Cultivated. ¹⁹ Upland plains in the south, flat to rolling plains along the Ganges, deserts in the west, and Himalayas in the north. ²⁵
- Economic Development: 270M of population (22%) live below the poverty line. High rates of poverty, illiteracy, inequality, malnutrition, and food insecurity persist and continues to plague India. ^{25 27}
- Food Staples: Rice (staple for more than half of population), along with wheat, sorghum, pearl millet, maize, and pulses. ¹⁷
- Political Stability: Ranked 33rd from the bottom for political stability, but the situation has improved over the last 8 years. ²⁸

FACING CLIMATE CHANGE IN SOUTH ASIA

Temperature Increase

Rise in global temperatures is the driver of the rise in sea levels. This will exacerbate glacial and snowpack melt, loss of crop production, and health issues. Glacial melt will impact river flow, stress on the environment, air and water quality, and the widespread disease of man, crops, and livestock. In the past century, minimum night-time temperatures increased at a faster rate than daytime temperature. ²⁹ This closing of the gap between day and night temperatures was associated with a steady increase in atmospheric greenhouse gas concentrations ²⁹ and the subsequent reduction in cereal crop yield. ³⁰ Also, rice production decreases by 10% with every 1.8°F rise in temperature above 86°F. ³¹

Bangladesh

Warming of 1.4°F is likely over all Bangladesh by the year 2030; 5°F by 2100. ³²

Pakistan

Temperatures are projected to be above global average: 2.5°F – 6.7°F by the 2060s; 11°F by the 2090s; higher during winter and in the north. Large acreage of wheat and rice will be impacted in areas already considered intense heat zones. ²⁴

India

Warming of 1°F is likely over all of India by the year 2030; 3.6°F - 7.2°F by 2100. ²⁷

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Expected Sea Level Rise

Rise in sea level intrudes on coastal river deltas increasing inland from storm surges, causing increases in soil salinity and affecting crop yields. Rising seas also reduces access to available land for both agriculture and shelter. Sea level rise is not uniform globally and where one area rises by more than the global average another area can falls.

Bangladesh

Bangladesh is expected to suffer one of the fastest sea level rises in the world due to the significant elevation of sea surface temperatures in the shallow Bay of Bengal.³³

Projections for sea level rise along Bangladesh's coast range are projected to be up to 3 ft by 2100.

Pakistan

Sea level rise is projected to be between 1 ft and 3 ft by 2100. Sea level rise and saline intrusion threaten coastal infrastructure, agricultural lands and aquifers in Karachi and the adjoining highly productive rice growing Indus delta region. With a sea level rise of 3 ft by 2100, about 18% of the delta region will be lost, affecting 13M people and crippling national rice production by 16%.²⁴

India

Total sea level rise (including tides) is projected to be between 1 ft to 2 ft by 2100 along the northern part of the east coast of India.³⁴

Storms, Droughts, and Monsoons

The severity and frequency of storms, droughts, and the tropical monsoon are driven by sea and air temperature. With climate change, areas that currently experiencing droughts and severe storms will see them increase even more so.

Summer wet monsoons (April to September) in particular are a necessary part of the South Asian eco- and agrarian systems, providing water to support crops and livestock and to re-invigorate river delta soils, flora, and fauna. The severity, frequency, timing, and path of the monsoons are critical. Climate change can shift any of these variables - impacting both agriculture production and the ecosystem resulting in food shortages.

Bangladesh

Bangladesh is extremely vulnerable to wind and water-related disasters. Eighty percent of the land area of Bangladesh is a floodplain with mean elevations ranging from less than 3 ft on tidal floodplains, 3 to 10 ft on the main river and estuarine floodplains, and up to 19 ft in the Sylhet basin in the north-east.³⁵ In an average year approximately one quarter of the country is inundated with flood waters; every four to five years there is a severe flood that may cover 60% or more of the country³⁶ impacting the vast floodplain. This area is home to 250M poor farmers²⁰ and Bangladesh's largest city of Dhaka (18.2M), with an elevation of approximately 13 ft. Storm surges from more frequent and stronger cyclones has push walls of water 50 to 60 miles up the delta rivers,³³ causing damage to and degrading delta river basin soils.²⁰

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By 2100, the power of tropical storms is projected to significantly increase in the northern part of the Indian Ocean, affecting Bangladesh. Cyclone-induced storm surges are likely to be exacerbated by a potential rise in sea level of over 1 ft by 2050.³⁷ More erratic rainfall is expected by 2050 and will result in increasing droughts, especially in drier northern and western regions of the country. Precipitation rates may increase by 20% to 30% by 2100.³² Vast floods in Bangladesh in 1998 displaced over 30 million,³⁸ a prelude of the future when the projected increase in frequency and severity of storms will impact the hundreds of millions of Bangladeshi residing in the floodplains.

Pakistan

Increased frequency and intensity of extreme climate events will further worsen drought prone areas.

Short term: Increased frequency of heavy snow and rainfall will trigger avalanches, floods and landslides.

Long term: As glaciers and snow packs recede, reduced availability of water will actually be the result. Deterioration of agricultural land will occur due to saline intrusion, soil erosion and waterlogging.²⁴

India

More severe storms, especially cyclones, will cause more damage to the infrastructure and exacerbate salt water intrusion. Changes in the timing and severity of monsoon rains will make the production of food and other agricultural products more uncertain, and affect lively hoods.²⁷ Disruption is already apparent in India. In 2016, wet monsoons came early in southern India and flooded out rice plantings. In early 2017, there was a lack of rainfall and rice crops failed. In addition, the lack of rain has critically reduced the availability of drinking water.³⁹

In 2016 in the South India tea region, the wet monsoon season was lower than normal, resulting in crop losses. The rainfall pattern has been erratic over prior years and tea growers are being forced to look at alternatives such as drip irrigation to sustain their production levels. However, the high cost of installing drip irrigation infrastructure is prohibiting the planters to adopt such systems.⁴⁰

Climate models also predict an earlier snowmelt which could have a significantly adverse effect on agricultural production. Growing greenhouse gas emissions from energy production and other sources may suppress rainfall, adding to drought conditions. Farmers will further experience drier conditions with more dust and smoke from the burning of vegetation, which also affects regional agricultural production.²⁷

Water Resources

Water for drinking and agriculture in South Asia originates from ground water and the melting of glaciers and seasonal snowpack melt. With rising temperatures, snowpack and glacial melt will increase, resulting in water over-availability and flooding. Once the major

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melt has diminished, the result will be water shortages. In delta river areas, ground water will be severely impacted due to saline intrusion.

Bangladesh

Ground water will be acutely impacted due to saline intrusion in coastal, delta regions, and larger portions of the country.²¹

Pakistan

The Indus River, Pakistan's primary freshwater source, receives 50% to 80% of its flow from snow pack and Himalayan glacier melt. The remainder comes from rains during the wet monsoon season.

Next few decades: The rapid melting of glaciers and reduction in snowfall causes an increase of river volume and glacial lake flooding, impacting cities and agriculture in delta areas.^{24 41}

Long term: Water levels are significantly reduced as glaciers and snow pack disappear, stressing agriculture and drinking water resources. Summers will increasingly see dry streams, withered and abandoned crops, dead fish and low groundwater levels. Water-stressed areas will transition to water-scarce areas by 2025.^{24 41}

With climate change, rain instead of snow, will fall on mountains in spring, leading to peak river flows prior to the main growing season. Summers will increasingly see dry streams, withered and abandoned crops, dead fish and low groundwater levels.^{24 41}

India

Early snowpack and glacial melt may yield more runoff in the short term but less in the medium and long terms, affecting available water for drinking and agriculture.²⁷

Agriculture -- Food Crops

Food crops will be impacted by higher average night-time temperatures, along with rising sea level, storms, pests, atmospheric particulates, and lack of salt-free water.

Approximately 88% of the rice supplied in the world is produced in the river delta areas of South Asia and Southeast Asia.²⁰ Rising sea levels coupled with the increase in frequency and severity of storms will see deterioration of the soils of this rich agriculture area.²⁰ For the staple food crops of South Asia (rice, wheat, maize, and soybeans), production drops with an average increase in average night-time temperatures during the growing season.³⁰ Rice yields also drop by 10% for every degree rise in 2°F above 86°F.³¹

Livestock will also be impacted by high temperatures, vector-borne diseases, lack of fresh water, and lower feed production. Food shortages would most likely result in increased food prices, placing the poor at risk with malnutrition.

Bangladesh

Bangladesh's water, agricultural resources and coastal infrastructure are particularly vulnerable. Saltwater intrusion threatens Bangladeshi freshwater resources and with changing temperatures, precipitation, and sea level rise could reduce agricultural

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productivity. Production of wheat, rice and other agricultural products in Bangladesh will be vulnerable to increasing water-related extreme events.³⁷

Pakistan

Pakistan will experience increased incidences of pests and soil erosion from altered growing seasons.

Increase in maximum and minimum temperature in winter season results in shorter winters and longer summers. The late onset and early ending of winter will reduce the length of the growing season for wheat and other crops in the Indus Delta Region. Banana is another major crop and these temperature changes will have a devastating effect on yield. Such adverse effects are already happening. These higher temperatures, and lack of water will decrease soil moisture reducing food production.⁴²

In recent years, the increased salinity in irrigation water caused a 40% to 60% reduction in major crop production; this crop loss will be amplified with climate change. Yields of rice, wheat, and maize are projected to decrease, resulting in increasing food prices, food insecurity, and malnutrition.²⁴

India

Agriculture will be negatively affected while demands for food and other agricultural products rise because of increasing population and their expectations of an improved standard of living. Millions of subsistence and small-hold farmers will experience hardship and hunger by not being able to accommodate unpredictable climate conditions.²⁷

Ocean Health and Fisheries

South Asia in general: Sea level rise and saline intrusion, acidification, and warming destroy coastal mangrove ecosystems, coral reefs, coastal lagoons, and estuaries, affecting a whole range of marine and essential wildlife and impacting 80% of fish caught off shore.²⁴
⁴² Rise in ocean temperatures force fish to migrate to cooler waters, reducing the harvest.^{43 44} Acidification due to increase of CO₂ in the ocean water impacts the food chain, also reducing the harvest.

Health and Contagious Disease

South Asia in general: Climate change is poised to worsen air quality in many parts of the globe. By the end of the century more than half of the world's population will be exposed to increasingly stagnant air with the hazardous build-up of soot, dust and ozone. The tropics and subtropics will mostly bear the brunt.⁴⁵ South Asia will experience an increase in heat-related mortality, an expansion of vector-borne diseases like malaria and dengue, and an increase in diarrheal diseases from contaminated food and water.²⁴

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Energy

Hydroelectric: With climate change, hydroelectric production will be disrupted by changing river patterns and volume flow. A 1% reduction in stream flow can reduce electricity output by roughly 3%. Generation rates will be higher in the spring but lower in the summer when energy is most needed for cooling. As we near 2100, receding glaciers and snow pack will impact river flow, eventually reducing production of hydroelectric energy. Greater uncertainty in the reliability of hydroelectricity will heighten the risk of disputes between the countries through which the rivers flow.⁴¹

Coal: Bangladesh, Pakistan and India are unable to meet their population energy needs without using coal as an energy source.⁴⁶ Pakistan is planning to build 12 new coal plants within the next 15 years.⁴⁶ Bangladesh is starting construction of a new coal plant this year,^{47 48} and India has plans to build 370 coal-fired plants in the future.⁴⁹ Nearly half of the net increase in world-wide coal-fired energy generation occurs in India through 2040.⁵⁰ Detrimental bi-products of coal are CO₂, black carbon particulates, and sulfur, all leading to increased rise in temperature, loss of crop production, and health issues. The growing reliance on coal for energy in South Asia raises the issue of using "clean coal". Clean coal is a misnomer. It is not the coal itself that is clean, but the emission control technologies that produce a "clean" result by removing greenhouse gases such as CO₂.⁵¹ Although it is recognized that some type of CO₂ removal will be required to meet the Paris temperature targets, it is expected to take decades before CO₂ removal technologies are mature enough to be available at the required scale and low cost.^{52 53}

Other Clean Energy Resources: For India, development of nuclear energy will be slow and face opposition. Renewable technologies will require technology transfer and infrastructure development.²⁷

Migration

Climate change induced migration within a country and between countries will be of major concern to the security of the region including contributing to human trafficking.^{54 55 56} Some of the resource allocation agreements and migration policies in India, and other parts of South Asia are not comprehensive enough to deal with the added impacts of migration aggravated by climate change.⁵⁷ With rising sea levels coupled with the increase in frequency and severity of storms impacting the agriculture rich areas of the river delta basins of South Asia are poised to be of concern as a major source of migration for the region.

Bangladesh

Of these three South Asian countries, the most damaging effect will be to Bangladesh. With a large percentage of its population residing near sea level, Bangladesh will be at the most risk for displacement of people due to the effects of climate change. About 35 million people live in the coastal areas of Bangladesh, half of them living in low-lying areas which are prone to extreme climatic events. Rising seas will likely force millions of Bangladeshi citizens to move from the low-lying coastal areas as soon as 2050 if not before.⁵⁸ With

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Bangladesh's scarcity of land and high population density, northward migration may be limited and force some migrants into parts of India.⁵⁶

Pakistan

With a sea level rise of 3.3 ft by 2100 and the impact of climate change on food, water and shelter, migration from affected areas to cities will place stress on current high-stressed resources. Attempted migration to India will most likely take place, which are further complicated by religious and political divisions.

India

India currently receives immigrants from a number of countries. With climate change, it may be inundated with many more, particularly from Bangladesh. Such migration may heighten tension between the two countries as well as putting a strain on Indian central and state governments.²⁷

Threat to Global Security

Syrian Civil War: A Case of Climate Change and Conflict

To understand the potential consequences climate change has on vulnerable nations, we can look to Syria's unprecedented multi-year drought to see how it has contributed to that country's civil war. This scenario is a viable guide as to what is likely to occur in South Asia and other vulnerable nations due to climate change.

There is compelling evidence that the 2007 to 2012 drought in Syria has been caused by climate change.^{59 60} It was "one of the worst long-term droughts and most severe set of crop failures and livestock devastation in its modern history".⁶¹ This drought caused water shortages, widespread crop failure, and deterioration of social structures and economic conditions.^{60 62 63 64 65} As a result, recent studies have shown that these effects of climate change have contributed to the current on-going conflict in Syria which started in 2011.^{63 64 65 64 64} This internal strife has caused over 400,000 deaths, mass migration of 6.1M from the rural areas to cities, 4.8M to nearby countries, and to a lesser extent to Europe.⁶⁵ Even though climate change is shown to have triggered the Syrian drought, the cause of the civil war involves several other factors that have been aggravated by climate change including social, political, and economic issues.⁶⁶ This situation represents a real time example of DoD's definition of climate change as a Threat Multiplier^{1 3}

What is happening in Syria today may only be a precursor for the future. In South Asia alone tens of millions could be displaced by the effects of climate change resulting in millions from Bangladesh and Pakistan seeking refuge in India, not unlike the millions of migrants seeking refuge from the civil war in Syria.

Bangladesh

Bangladesh, a populous country with about half its citizens below the age of 25 is experiencing rapid population growth.²⁵ It's ranked 21st from the bottom for political

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stability.²³ Under the best of circumstances the population growth alone by 2100 will put a tremendous strain on resources for such a poor country. With the effects of climate change, the strain on resources will be exacerbated. In 2011, a monsoon left 10,000 homeless and many dead,⁶⁷ a prelude for what could become a common occurrence by 2100. The potential for conflict with India is further intensified with the possibility of massive migration.

Pakistan

Pakistan is a viable nuclear power with a government vulnerable to political instabilities.⁶⁸ The country has never developed a government that is responsive to the population and contains many sectarian rivalries. Pakistan is ranked as the third worst unstable country, placing above Syria and Yemen, which have ongoing military conflicts.²⁶ With over 50% of the population under 25 years of age, the country faces increasing demands for housing, water, and food resources.²⁵ These demands will be further aggravated by climate-related events and internal migration within the country; this could include conflict over resources, infrastructure breakdown, riots, economic decline, government instability, and migration. This could also leave the nuclear weaponry in control of terrorists and extremists. Its current strained relationship with India and persistence of terrorist attacks⁶⁹ by either country is enhanced by the effects of climate change.

India

India is a G-20 country with a population of 1.3B people.²⁵ Although it has many modern industries, the country is constrained by corruption, over-regulation, and over-population. Because of its size, climate change events such as increases in monsoons and sea level rise are likely to cause internal strains as portions of the population are forced to migrate within the country. India sees migration from Bangladesh and Pakistan as a major threat to its resources and as a major source for terrorism.^{70 71} India is currently building a fence on its borders with Bangladesh and Pakistan to keep out illegal migrants and terrorists.⁷²

The Center for Climate and Security reports that “**Resource allocation agreements and migration policies in South Asia are not comprehensive enough to deal with the added impacts of climate change**”.⁵⁷ The potential for major conflicts between India, Pakistan and Bangladesh over migration and resources could multiply. With both Pakistan and India being nuclear states, the ending of an already fragile international peace in the region, highly intensified by the displacing effects of climate change is of major concern. A regional war in these countries could easily develop into a global conflict. It is critical that the United States maintain its military influence and regain its international climate leadership to help defuse the likelihood of threats such as these to US and global security.

Actions Needed

Support Secretary of Defense General, James Mattis, to implement his
> vision for a broader whole-of government response to climate change
> strategy for the appropriate role of the Department of Defense in addressing national security aspects of climate change.

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Lobby to include climate change in government Executive Branch Agencies in their planning and decision making.

Lobby to re-join the Paris Agreement

Provide funds in Congress's budget for the following programs that were cut or excluded from the President's Budget Submit of March, 2017 (see "Budget Cuts for NOAA NASA" - report provided in April, 2017):

- Department of State to support climate change mitigation in poor nations.
- USAID to support climate vulnerable nations.
- NOAA Climate Change grants and programs
- NASA Climate Satellites – three in approved phase, one operational.
- NOAA Joint Polar Satellite System - satellites 3 & 4 (also to be used by USAF). Partially funded in the latest NOAA budget.

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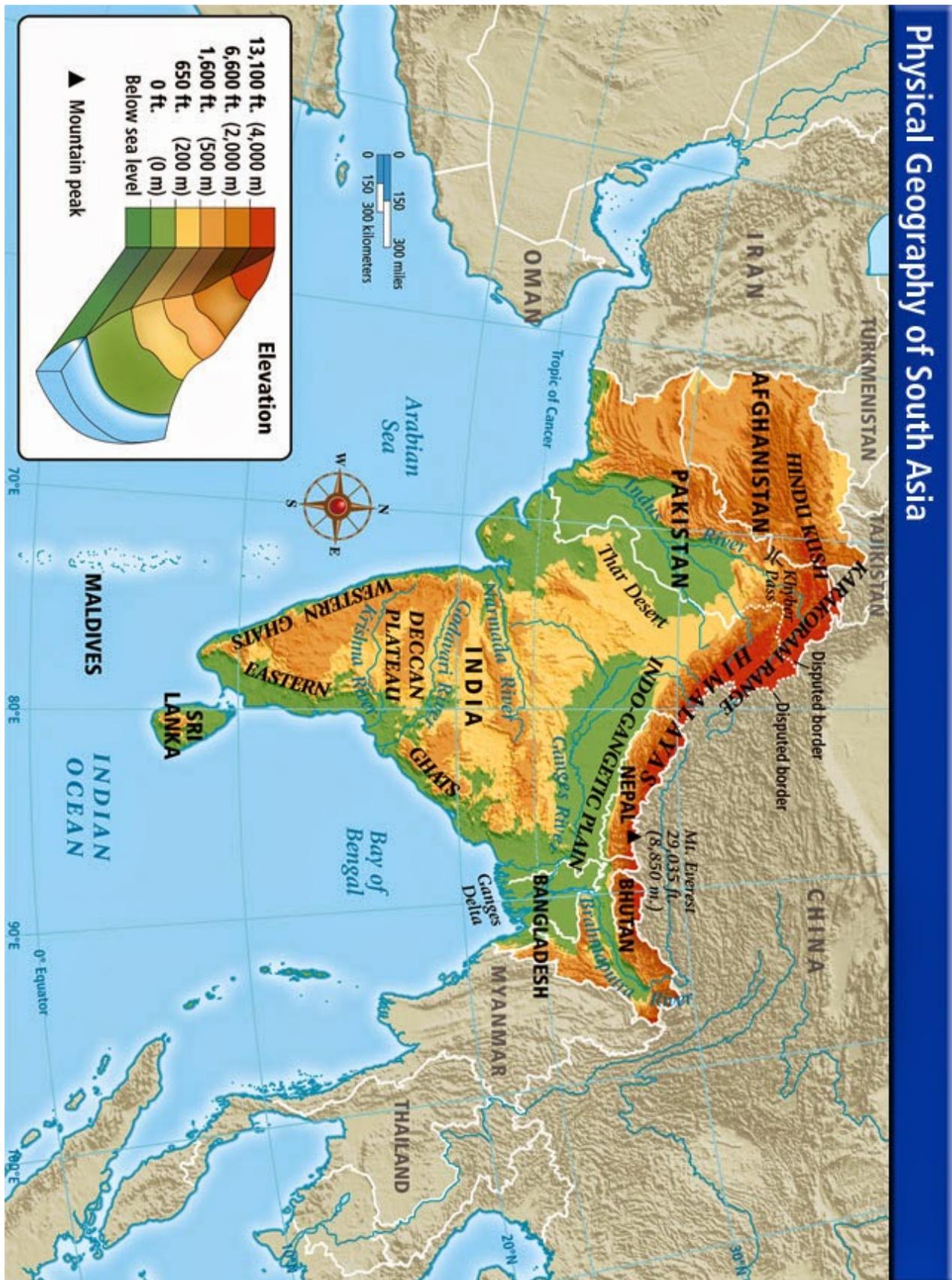
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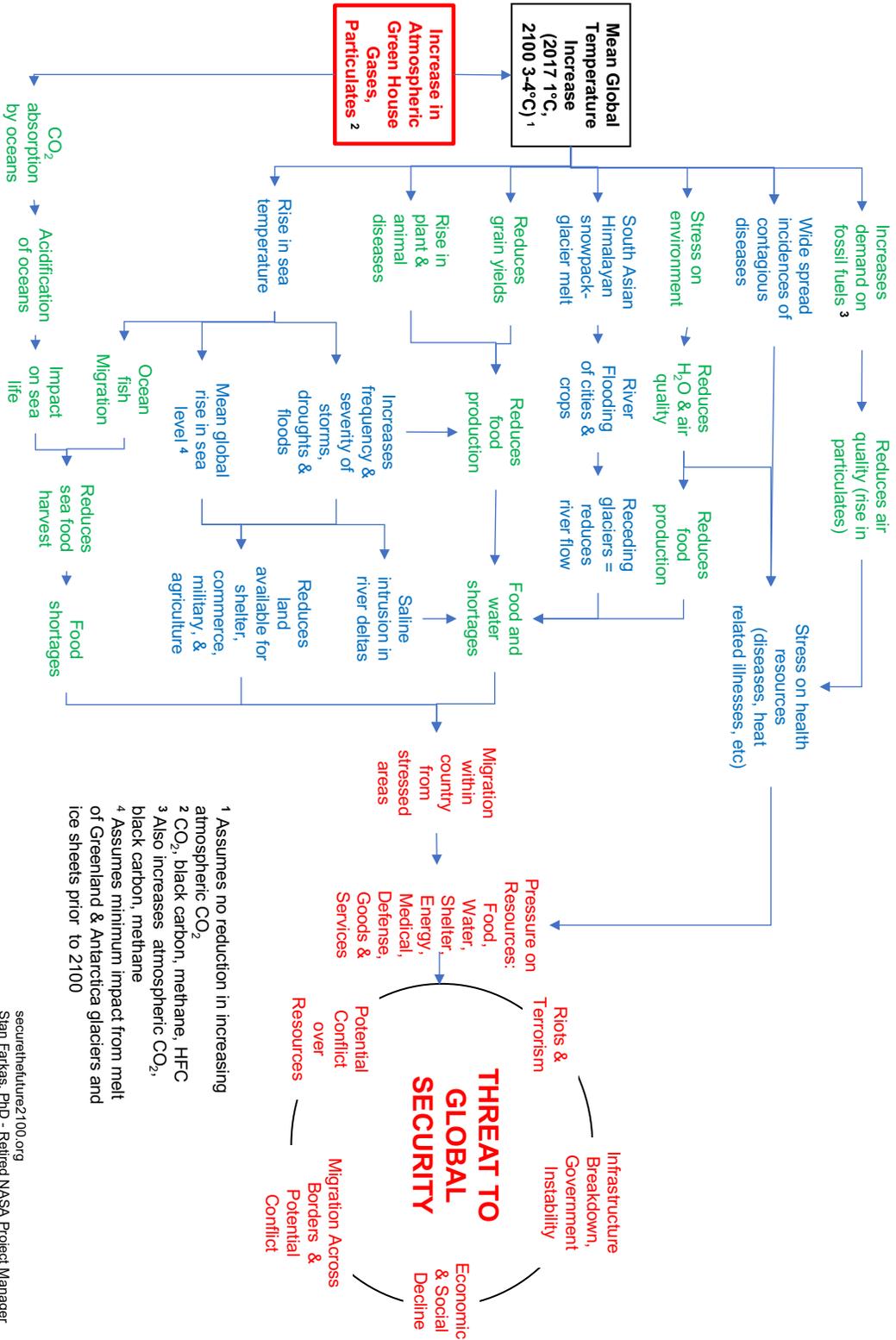
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1 Assumes no reduction in increasing atmospheric CO₂
 2 CO₂, black carbon, methane, HFC
 3 Also increases atmospheric CO₂, black carbon, methane
 4 Assumes minimum impact from melt of Greenland & Antarctica glaciers and ice sheets prior to 2100