

Effect of Afghanistan War on Environment

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ABSTRACT

Great environmental damage occurred in Afghanistan during the last 3 decade war. This prolonged and divesting war deliberated environmental damages. War have impacts on peoples' lives and there is no doubt that such impacts are detrimental to human physical and mental well-being in the short and long terms. Needs in the event of a terrorist attack involving the use of chemical and/or biological warfare (CBW) agents. Several decades of war and its consequent has brought devastating destruction throughout Afghanistan from various sources. Biodiversity lost and soil degradation are also effected by war. ongoing conflict, internal displacement, high rates of population growth, low levels of education, and poverty, result in damage of environment and longer-term sustainability of natural resource use and management. This article reviews the adverse consequences of war on different components of Environment such as Biodiversity, soil, deforestation and Public health.

Introduction

1. Effect of Afghanistan War on Biodiversity

Afghanistan is a land-locked country with six neighbours: Tajikistan, Uzbekistan, Turkmenistan, China, Iran and Pakistan. Which have medium size of (652,230 km²) with semi-arid steppe climate, dry summers and cold winters and only 12% of the land area is arable. "Elevation of the Afghanistan Mountains varies from 7,485 m to 258 m and the highest peak of the mountain is called the Now Shakh peak in Pamir Mountains. Hindu Kush Mountain and Pamir Mountains are the two well-known mountains ranges of Afghanistan. The Hindu Kush mountain range extends from the east into the center of the country while the Pamir Mountains is located in Far East near to china borders (1). Afghanistan population is increasing swiftly. An estimated population in 2013 was nearby 27 million in 1978 early on the beginning of the war the Afghanistan population was about half of the population in 2013 (2). Afghanistan is a country rich in natural resources, biodiversity resources have outstanding landscapes of mountains, deserts, woodlands and forests .Most of the Afghanistan population about 80 % livelihood depends on natural resources and associated biological diversity, Therefore the biodiversity is being degraded because of immediate needs of food especially for internal displacement people beside that high rates of population growth, low levels of education and poverty also effect the sustainability of natural resource utilization and its management over a long period of time (3). Several decades of conflicts has brought devastating destruction throughout Afghanistan. "Afghanistan have a semi-democratic environment, some people are still dealing with periodic violence, and inappropriate consequences of war techniques, such as the use of depleted uranium in metal penetrating bombs used in Afghanistan by various friendly and unfriendly forces (4). According to a study by Groombridge and Jenkins shows that Afghanistan is not a global biodiversity hotspot they calculated a comparative index of biodiversity for all countries over 5,000 km² based on the number of mammals, birds,

reptiles, amphibians, vascular plants and endemic species. "Afghanistan's index is -0.296 which shows that its biodiversity index is lower than the median .A score of "0" is the median .Afghanistan's relatively low score results is largely from the lack of vertebrate endemics. Compare to Afghanistan some neighbouring countries have a higher biodiversity index and some have a lower biodiversity index such as Pakistan (-0.121) and Iran (-0.194) are higher, but still below the median and some such as Tajikistan (-0.536), Turkmenistan (-0.572), Uzbekistan (-0.413), and Kazakhstan (-0.581) are all lower than Afghanistan. Footprint analysis shows that Afghanistan's per capita bio capacity is declining. According to Global Footprint Network Afghanistan Ecological Footprint is 0.79 gha/ person, Afghanistan bio capacity is 0.5 gha/ person, Afghanistan total bio capacity is -0.3 gha/ person per person and Afghanistan total bio capacity is -8.95 gMha. Countries with a footprint below 1.73 gha per person are not be sustainable (5). Afghanistan remote sensing studies shows that 8,000 km² of Afghanistan's land has been degraded (6). Afghanistan huge terrain of mountains, Mountains of the Hindu Kush and Pamir mountains range located in the north of the country. "Afghanistan represents the western edge of the Greater Himalayan mountain chain which was born about 70 million years ago when the Indian subcontinent slowly ground into the Asian land mass, raising the largest and highest mountains in the world". Mountain ecosystems are important reservoirs of biodiversity. The snow leopard is one of the adapted mountain animal which hunt and kill the large wild goats and sheep that live within that regions. The ibex, Markhor, Argali or Marco Polo sheep also live in high mountains of Afghanistan. We can find the snow leopard in twelve countries around Central Asia .There is no good data exists on number of snow leopards in Afghanistan, it is estimated that "not more than 200 and probably less than 100 still exist there (7). Afghanistan conflicts and wars have direct effect on biodiversity loss. Pressures such as bombing, poaching, Landmines, Refugees, deforestation, over-grazing are effecting the habitat of animals. Unfortunately, biodiversity

conservation is very less Afghanistan and country has no history of conservation. Growing human population combined with Lack of environmental protection drive many species of plants and animals to the brink of extinction. Bombing, many military activities, ground fighting, landmines, guerrilla warfare, conflicts among the Taliban and the government military soldiers all effects habitat of animals. Undoubtedly some of guerrilla troops encamped within the mountains and caves of snow leopard habitat, a number of animals in these areas have been killed by Heavy air strikes which are targeting these regions. Not only snow leopard but a huge number of other species are also suffering the consequences, such as the large numbers of migratory birds. "Some of endangered migratory bird's species such as cranes and pelicans depend upon staging areas in Afghanistan to rest and find food during the long migration. Disturbance from bombing, aircraft flyovers, and troop activities can effect these birds with the result that the birds face possible death from exhaustion, tiredness and starvation (7). During the 2000 and 2001 Afghanistan had the most reported unexploded ordnance and landmines in the world (8). Some of grenades, bombs, mortar shells and cluster munitions, have been scattered during military activities in Afghanistan but have failed to explode. These Unexploded ordnance are also a threat to biodiversity. Most of the land mines laid in Afghanistan during civil war between 1978 to 1989 estimated to be around seven million to eight million(9). Antipersonnel mines (landmines) have been scattered randomly, laid singly as traps or placed in concentrated clusters have direct impact on destroying snow leopard's habitat and their prey. "These landmines have not only caused damage to humans and wildlife, but have destroyed hundreds of irrigation systems in Afghanistan". The impact of refugees on vegetation and biodiversity can be a problem. Refugees, need food and fuel. Their request for fuel will cause cut down of trees in the few remaining forests. They will sell or use these woods and this will force snow leopards to hunt domestic livestock of the region. "Cut down of trees brings snow leopards into contact and conflict with armed shepherds, who will kill the snow leopards to protect their livestock. According to the Afghanistan Convection of biodiversity around 137-150 species of mammals, 6-8 amphibians, 428-515 birds (including migratory species), 92-112 reptiles, , 101-139 fish, 245 butterflies, and 3,500-4,000 vascular plant species are native to Afghanistan Only seven vertebrate species (mammals, none; birds, Afghan Snow Finch (*Montifringilla theresae*); reptiles, Leviton's Gecko (*Asiocolotes levitoni*), *Cyrtopodion voraginosus*, *Eremias aria*, Point-snouted Racerunner (*Eremias afghanistanica*); Amphibians, Paghman Mountain Salamander (*Batrachuperus mustersi*); fish, *Triplophysa farwelli*) are known to be endemic to Afghanistan, but estimates for endemic plant species range as high as 30% (10). "The Argali or Marco Polo sheep (*Ovis ammon poli*) a vulnerable species of IUCN red list also inhabits in the mountain of Afghanistan and areas of central Asia above 1,000m (11). IUCN Red List of Threatened Species in Afghanistan is estimated to be 39 species and out of these 39 species about sixteen of the listed species are mammals and nineteen are birds. Some of the subspecies mammals such as the Caspian tiger is one of Afghan taxon is considered to be globally extinct, seven of subspecies are Critically Endangered, eight are endangered, and 31 are Vulnerable (12). Although hunting happens in Afghanistan in a

very small scale but hunting was more common up to 1979 for harvesting animal products, meat and furs (13). The article (14) listed the most heavily threatened Species by hunting or trade in Afghanistan. The first one in this study list is Argali or Marco Polo sheep (*Ovis ammon polii*). Argali or Marco Polo sheep are the real mountain icons for Afghanistan. They are wild sheep have long and very impressive horns, life in high-altitude and important species for high-altitude. "Today, they are living in above 4500 meters in the western and eastern sections of the Big Pamir and much of the Little Pamir and Wakhjir Valley (15, 16, and 17). The second threatened Species by hunting or trade in Afghanistan is Markhor (*Capra falconeri*). There are three subspecies of markhor in Afghanistan (*C. f. heptneri*, *C. f. falconeri*, and *C. f. megaceros*), lives throughout the rocky forests and high mountains of the eastern provinces, especially in in the northern border territory with Tajikistan and much more in central areas of Kabul and Kapisa provinces (18). The third threatened Species by hunting or trade in Afghanistan is Urial (*Ovis orientalis*). "Urial sheep are distributed at mid-elevations within the Hindu Kush Mountains and the ranges of central and south-western Afghanistan mountains (19). There is no reliable data exist about population of urial in Afghanistan and many believes that their numbers are decreasing. The Urial is listed on Afghanistan's protected list and major threats for Urial (*Ovis orientalis*) are human disturbance, habitat fragmentation, heavy hunting for horns, meat and furs (20). The fourth threatened Species by hunting or trade in Afghanistan is Snow leopard (*Uncia uncia*). The fifth threatened Species by hunting or trade in Afghanistan is Asiatic black bear (*Ursus thibetanus*) and Other threatened Species by hunting or trade in Afghanistan are Large-billed reed warbler (*Acrocephalus orinus*), Saker falcon (*Falco cherrug*) and Greater flamingo (*Phoenicopterus roseus*) (21). Some studies shows that war has the potential to bring adverse consequences to ecosystem structure and function in short or long term on both acute and chronic types which have consequences such as habitat alteration, environmental pollution, disturbance of population, declines of biodiversity and many other problems (22). Armed conflict in Afghanistan between government and non-governmental groups is a combination of active military actions that includes aerial assaults, naval craft operations and ground forces (23). "Aircraft (both rotary and fixed-wing) are commonly used in military operations in Afghanistan. They can produce bursts of noise such as sonic booms, jet after burners or rotary pulses. The auditory system of many animals is more sensitive compared to humans (24). Thus aerial activities have a significant source of noise pollution which is also one of the global concern for the wellbeing of wildlife. (25, 26). The production of noise from military activities and aircraft has variable impacts on wildlife, which include primary, secondary, and tertiary effects of noise pollution (27). Both lethal and sub-lethal impacts of noise pollution have the potential to cause permanent damage. "The Primary effects can include eardrum rupture, shifts in hearing abilities (either temporary or permanent), and auditory signal masking (e.g., unable to identify noises from prey, predators, or mates). Secondary effects are related to physiological impacts which can lead to impediments in reproduction, foraging behaviour, and natural habitat use of wildlife residing in areas where aircraft noise is prevalent. Tertiary impacts consist of a combination of primary

and secondary effects that can lead to population declines, species extinction, and habitat degradation and destroy natural habitat (28). Aerial military warfare cause elevations in wildlife mortality (29). Terrestrial conflict Ground warfare often takes place in sensitive and remote locations around the globe and unfortunately a large number of biological hotspots have set in these remote locations (30, 31). Weaponry fire and military activities also poses risk to the environment (32). Troops often take shelter or fight battles in forested areas. Sometime their activities can cause forest fire on these regions and destroy the local ecosystem and linked biodiversity to that ecosystem (32). "Nuclear blasts cause thermal emissions which have a number of adverse impacts on local ecosystems (33, 34). Each Blast in Afghanistan release a large amount of kinetic energy, originate or emit around (1–3500+ kPa) and this emission of kinetic energy is able to damage to large proportion of the surrounding plants. The blast force is capable of denuding foliage, damaging branch structure, uprooting vegetation from the soil and effect plants primary production (35, 36, 37, 38, and 39). The impacts of war on ecosystems are not limited to military armed conflict events, but can be influenced by, the development and operational use of military training bases, a military training ,training exercises and tactical operations that can range from small outpost sites to large military cites (40, (41, 42, and 43). The variation in size and operational use of military training bases leads to a broad spectrum of anthropogenic severity impacts on local ecosystem (44, 45) Military activities have environmental contamination at each of these stages which is associated with the testing, production, transportation, and deployment of weapons (46, 47, 48). In a warfare context, most of the chemicals that can be used for manufacture of the weapons are strongly toxic compounds (49, 50). Many of the products designed to destroy the targets mostly human targets, so at the same time may pose negative impacts on other species ". Often cause five types of effects such as choking agents that affect the respiratory tract, blistering agents that cause burning and blistering, nerve agents that target neuron impulses, blood agents that interrupt oxygen absorption, and riot agents that cause immediate, short-term incapacitation (50). Most chemical agents that can harm humans are toxic to other vertebrates and can injure or kill some aquatic organisms at high concentrations. Often, these chemicals store and accumulate in plants vacuoles and tissues and create potentially toxic effects to herbivores due to consumption (51, 52). Bullets and related debris (e.g., shell casings) are often composed of materials that can be harmful to the ecosystem. Most of these chemicals are heavy metals. "Lead, one of the more commonly used metals in bullets and casings, has toxic properties that are highly detrimental to a number of organ systems in vertebrates including the nervous system (53, 54). Lead and depleted uranium are the most toxic chemicals to biodiversity have been used in metal penetrating bombs in Afghanistan by various friendly and unfriendly forces.

2. Effect of Afghanistan War on Soil

Afghanistan is probably best known for its long period of conflicts that caused large-scale destruction to Afghanistan's environment, its natural landscapes, natural resources and country's soil. "Large amount of Afghanistan's land was degraded between 1981 and 2003 and a large scale remote sensing analysis shows that approximately 8,000 km² of land

had been degraded (55). Afghanistan suffered the most reported landmines in the world during the 2000 and 2001 (56). Maximum number landmines 7 million to 8 million were laid in Afghanistan in 1978 to 1989 (57). The term "bombturbation" is a very common term from 1978 onward in Afghanistan. Afghanistan environment is polluted by Chemicals warfare (CWs) every day and obviously these CWs are pollutants and create problems for soil, water, air, Human and biodiversity. CWs are made of chemicals elements such as Excess carbon, Excess hydrogen ,Nitrogen, Hydrogen and chlorine, metals and oxygen and many complex anther elements such as TNT,TATP,RDX,PETN,DIME, Azeroazide azide and many other chemicals which all of them have negative impacts on soil. TNT can rapidly turn into nitrogen gas and cause explosions, TATP (tri-cyclic acetone peroxide) have the peroxides properties. TATP is also known as the "mother of Satan" and with good reason because its explosions are known to be about 80% as strong as TNT. Dense Inert Metal Explosive (DIME) Aziroazide azide and many above chemicals play a major role in contemporary warfare in Afghanistan, and highly used among terrorist and insurgent groups. Landmines and cluster munition, M-72 light anti-tank weapon (LAW) Rocket-propelled grenades are a commonly used explosive weapon and very high used chemicals weapons in Afghanistan. Most of CWs have hazardous remnants. For example TNT is one of the most acidic phenols and have acidic remnants. Which make the soil more acidic and unfertile, as well the acidic components will leached out to the ground water and change ground water properties. At the same time acidic Sulphur gas may go to the atmosphere and cause acidic rain. Aziroazide or azoimide have acidic properties which make soil more acidic (58, 59). Carbon dioxide (CO₂) which is a byproduct of each bomb attack in the atmosphere makes all rain slightly acidic because combination of carbon dioxide and atmospheric water form carbonic acid. The pH of normal rainwater ranges among 5.5 to 5.6. While most of acid rain has a pH value of 4.0 to 4.6. "Acid rain can dissolve minerals to soil much quicker than normal, thus allowing nutrients to be released and leached away. Most soils can tolerate some extra acidity in rainfall .This is because they have a residual buffering capacity due to the presence of limestone and bicarbonate in solution that can neutralize additional acidity. As the acidity of soil increases by acid rain or other acidic compounds, these acids increase the release number of the hydrogen and aluminum ions in soil, Aluminum dissolves rapidly once the soil water's pH is below 4.5. High aluminum levels in soil solution will totally stop the growth of many plants and soil microorganisms. Release of hydrogen and aluminum ions leads to nutrients decrease for soil microorganisms and if the nutrients available to these basic links in the food chain are reduced, their population, along with the ecosystem that depends on them will suffers". Acid rain can harm terrestrial plants by damaging outer leaf surfaces, changing the root environment by wash out of the waxy protective layer of the roots, leach out of Important nutrients such as calcium, magnesium, potassium from leaf tissue ,killing of tree saplings, postpone seeds germination, postpone the Plants growing in high altitudes (especially cloud forests (60). Acidification and leaching of acidic CWs inputs decrease the soil's buffering capacity. Acid deposition from CWs can acidify the forest soils. "After the buffering capacity of the soil is depleted, the soil pH

drops swiftly which have above and many other adverse effects in the ecosystem. CWs may also decrease the organic matter content of soil leading to a decrease in the CEC of soil and as a result the capacity of soil for adsorbing heavy metals decrease also decreases in organic matter of soil leads to an increase in erosion of soil. Since pollutants have a tendency to accumulate in the upper part of the soils, this will cause an increase in flux of metals from soils to the aquatic environment and effect growth of the plants (61). any accumulation of pollutants in soils, sediments and groundwater due to natural process or as a consequence of human activities is a serious concern (62). A chemical time bomb (CTB) refers to a chain of events resulting in the delayed and sudden occurrence of harmful effects due to the mobilization of chemicals stored in soils and sediments in response to slow alterations of the environment. CTB have different Sources of contaminants such as Industrial activities, Energy use, Agricultural activities, Urban, domestic, commercial activities and Military activities (63). The ecosystem has a capacity to buffer against adverse effects of chemical pollution such as buffering mechanisms, immobilization (retention) of pollutants, phytoremediation or a limitation of their bioavailability. We can see the adverse effects of pollutants on ecosystem only when the buffering capacity of an ecosystem is too small to retain or inputs of chemical weapons is too much that time (64, 65). Depending on exactly where the explosion occurs (above, on, or below the soil surface), bombturbation excavates a volume of soil from the site of impact, forming a depression and spreading much of the ejecta out as a surrounding rim of mixed, but sometimes slightly sorted, debris. Most of explosions are nonselective, that is, all of the material removed is mixed and redistributed. Bombturbation and explosions causing existing soil horizons to be entirely destroyed or intimately mixed (66).

3. Effect of Afghanistan War on Deforestation

Damage of the forests may be the second ranking loss following the loss of human losses. Great environmental damage occurred during 1979 to 1991 the war between Afghan people and soviet occupation .The cutting of vegetation along the streets and highways in Kabul province and the neighboring Parwan province is a perfect example of environmental distractions. After the war a survey has been conducted by the communist government of the republic of Afghanistan in 1992 and they reported that nearly 3000 irrigation system, 43000 hectares of fruit orchards and 3 million units of farms implements wear destroyed as a result of Afghanistan and soviet war (67). The guerrilla troops used to hide beyond the trees and were ambushing the soviet army. Therefore a huge number of trees cut by army of Afghanistan to prevent hide of the enemy. LEDs, Landmines and forest fires also damaged a huge number of forests in Afghanistan. Deforestation and trees uprooting continued by Taliban period in Afghanistan. Taliban cut down trees from Afghanistan Mountains to sell them outside of Afghanistan (68). Tree planting, conservation of forests or conservation of biodiversity looks very unfamiliar words to most of the people in Afghanistan. Causes of Deforestation in Afghanistan are many such as War, smuggling, fuel use, overgrazing and many more causes. The Soviet army inflicted lots of damage to numerous pistachio trees by uprooting of those trees, and some of these combats caused several uncontrolled forest fires which

destroyed thousands of trees. Followed of Soviet war the Taliban were also known for their "scorched earth" tactics. Smuggling of the trees are illegal activities which effect Afghanistan forest and everyday full Truckloads of timber leave Afghanistan to Pakistan.

Afghan people have very little options in terms of the energy and fuel .Electrical lines and a few hydro power plants in Afghanistan were mostly destroyed during the many years of war. Poor and internal immigrants are cutting down the trees and burning the wood to meet their needs for food and fuel .sometimes they chop down trees of the few remaining forests and sell as an income source. The impact of internal refugees on vegetation and trees is a concern of deforestation. "Thousands of goat and sheep of internal refugees can quickly denude arid grasslands and bare shrubs cover lands. The real concern start at winter descends on the region, where winter temperatures fall well below freezing. Locating fuel wood for a family quickly becomes an issue of life or death in such a cold temperature". Afghanistan is a country that is only 3% forested, and much of the forests remained as isolated patches in various remote mountain located far from each other. "The inflow of millions of internal refugees which are moving through these mountains, create more pressure on environment and the remain forest patches are likely to be destroyed. These forests are vitally important as wildlife habitat and help control erosion on steep mountain slopes". Loss of these forests and grasslands can cause adverse effect through the ecosystem for many plants and animals which depend upon them for food, shelter, and breeding. The war effected every segment of the social, environmental, economic and political system of the country. Afghanistan post war environmental data are very limited and most of the available information is based on estimation or best judgments. Common causes of deforestation are mainly overgrazing, timber smuggling, unselective fuel wood harvesting, deforestation and root excavation .Total forest cover of Afghanistan has decreased significantly from 1980 onward and "estimate of 2.2 million ha (3.4% of the land area) with estimates of remaining forest ranging from 60 to 20% of that value (69, 70). According to the global assessment of soil degradation about 16% of Afghanistan's land area is severely affected due to anthropogenic activities, whereas the country's vulnerability to desertification is one of the highest in the world about 75% of Afghanistan is vulnerable to desertification (71). "Afghanistan's natural resources such as land, water, forests and mineral deposits are critical to the country's prospects for a peaceful and prosperous future an estimated 70-80% of the country's population rely on agriculture, animal husbandry and artisanal mining for their livelihoods (72). Afghanistan's Forests are the most important source of energy and forest products such as (firewood, timber, animal fodder, and tree crops) contribute to the livelihoods of millions (73). Highly dynamic local power structures can make control of land and vegetation difficult to anticipate (74). Forest and Vegetation life form play an important role for its extinction for example trees are more valued than grasses this is unfortunate in the many ecosystems where maintenance or restoration of native scrub would be more effective for protecting soil (75). Forests are source of rural energy but they also reduce the risk of soil erosion, land degradation and landslides. Over the past 30 years, growing demand for timber

and firewood, illegal timber trade have led to steep drops in forest cover. "Afghanistan's forest sector faces two quite distinct challenges. The first is to reduce the rate of deforestation for firewood and the second is to combat the illegal trade of high-value timber. One way to begin to address the illegal timber trade is to raise awareness of the impacts of the trade. Future steps could include some kind of certification scheme that provides a market for sustainably produced, conflict-free timber. Afghanistan has two basic forest types: closed forest of oak and conifer in the monsoon-influenced areas of eastern Afghanistan and savannah-like and the open pistachio woodlands originally located in an arc around the mountain regions. Closed forests (not including northern juniper communities) may once have covered about 5% of the country or about 34,000 km². There were about 3,600 km² of closed canopy forest remaining in the late 1970s; meaning approximately 11% of pristine forest covered then. Based on a number of assumptions, as much as half of that has been lost since the 1980s leaving some 1,800 km². Although there are many uncertainties, Afghanistan is probably left with roughly 5% of its pristine closed forest vegetation representing about 0.25% of the country's area" (76, 77). Only firewood harvest for the Kabul market results in the destruction of 10,000 ha of oak forest and 15,000 ha of juniper forest each year in Pakiya and Khost Provinces in addition smuggling of timber to Pakistan is also a concern of deforestation. "An study from the WWF eco-region map available on the internet shows Afghanistan with 15 eco-regions representing four biomes Five of Afghanistan's 15 eco-regions are considered as globally "Critical/ Endangered" and eight are considered "Vulnerable" Only the "Suleiman Range Alpine Meadows" and the "Northwestern Himalayan Alpine Shrub and Meadows" eco-regions are considered as "Stable/ Intact", and these ecoregions are barely represented in Afghanistan. Temperate Coniferous Forests on East Afghan Montane Conifer Forests is Vulnerable. Temperate Grasslands, Savannahs and Scrublands name as Gissaro-Alai Open Woodlands have Critical/Endangered state. Montane Grasslands and Scrub lands named as Karakoram-West Tibetan Plateau Alpine Steppe, Pamir Alpine Desert and Tundra are Vulnerable. Hindu Kush Alpine Meadow, Ghorat-Hazarajat Alpine Meadow, Northwestern Himalayan ecoregions are vulnerable. Alpine Shrub and Meadows (minor occurrence in Afghanistan) and Sulaiman Range Alpine Meadows (minor occurrence in Afghanistan) are Stable. Deserts and Xeric Shrub lands such as Baluchistan Xeric Woodlands and Central Afghan Mountains Xeric Woodlands are Critical/Endangered" After the 2001 ouster of the Taliban immediate needs for sanitation and food security have taken priority to problems such as reforestation. Reforestation programs require human capacity to both establish and maintain the maturing forest. Afghanistan, with its missing decades of forest management and a public often concerned with day to day survival, may well be a modern worst case scenario for the conditions associated with forest sustainability and the likelihood of reforestation project success (78).

4. Effect of Afghanistan War on Public Health

Both war and terrorism have impacts on peoples' lives and such impacts effects human physical and mental wellbeing in the short and long terms (79). Terrorist attack events needs involving the use of chemical and biological warfare (CBW)

agents. CBW agents can be biological agents, biological toxins, and chemical agents. "Established threshold limit values are not available for many CBW agents because most of the research on them has been associated with production and battlefield use and limited scientific work has been conducted in establishing safe criteria for public exposure to CBW agents (80). Although the problem of land mines and hidden homemade bombs, called improvised explosive devices (IEDs) has increased from close to zero a decade ago to more than 4000 per year in Afghanistan (81). Chemical Weapons have its chemical action on life processes and can cause death, temporary incapacitation or permanent harm to humans or animals. According to PUBLIC HEALTH RESPONSE TO BIOLOGICAL AND CHEMICAL WEAPONS, SECOND EDITION of WHO chemical weapons are Toxic chemicals, Munitions and devices which may have short time effect or longtime effect. Beside Chemical weapons, some endemic disease can increase rapidly during war and poverty (82). These CBWs may also cause fog unrelated to weather and water contamination. The byproduct of chemical warfare such as soot, and gases such as carbon dioxide, carbon monoxide and sulphur dioxide, make pollution within and beyond the region. "Afghanistan has the highest child mortality rates in the world; life expectancy hovers is around 44 years for men and women (83). An article from ALEC D. BARKER, (2011) studied the homemade bombs or improvised explosive devices (IEDs) in Afghanistan three provinces of Helmand, Kandahar, and Nimroz and the Pakistan province of Baluchistan. (IEDs) are common weapons of conflicts especially in Southern Afghanistan and Western Pakistan, where the Taliban and other armed groups use them to undermine recognized governments and policies. "The study shows that between 2002 and mid-2009, Kandahar province had been the location most prone to IED violence until early 2009, when it was overtaken by Helmand province in this regard, indicating a shift in the operational emphasis of the Taliban toward the U.S. and British forces operating there. Although northern Nimroz province has experienced fewer events. This study collected 1803 records of IED events using four databases for more reliability of information." In this article the below type of LEDs have been studied (84). IEDs by selected tactic, technique, or procedure, 2002–2009

- IEDs with Unknown Initiation
- IEDs Found and Cleared Anti-Vehicular IEDs
- Time-Initiated, Anti-Infrastructure IEDs
- Victim Operated IEDs
- Radio-Controlled IEDs
- Low-Metal Content
- Remote Control IED
- Suicide Person Borne IEDs
- Suicide Vehicle-Borne IEDs
- Fedayeen Attacks

Eighty-four percent of all IED-related casualties in Nimroz province came as a result of suicide attacks. Over the whole period, 64 percent of those exposed to IED blasts were wounded rather than killed. There have been at least 6,201 allied territories, government, and/or civilian dead and wounded as a result of all IED events in the period studied. Of these, 4,804 or 77.5 percent, occurred in Afghanistan. Whereas nearly half of all casualties occurred in Kandahar province, a

quarter of all casualties happened in Helmand province, and 18 percent and 13 percent of all events in the region occurred in the two large city districts of Kandahar and Quetta. The two border towns of Zaranj and Spin Boldak sustained the highest numbers of victims per attack, mostly due to suicide and vehicle-borne tactics. The most hazardous years in southern Afghanistan in terms of IED casualties was 2008, with 1,798 dead and wounded. Generally, suicide events occurred in a wide range from Quetta through Spin Boldak, Kandahar, Lashkar Gah, and Khash Rud, terminating in Zaranj. There were 285 suicide events in this study. Estimates 51 Fedayeen attack, in which an operative arms himself with multiple weapons, perhaps alongside several conspirators, to assault a target continuously until the moment when suicide becomes unavoidable. There is another article studies the 1636 individual injured by landmines and unexploded ordnance between March 2001 through June 2002. The data of this study comes from international committee of the Red Cross (85). During the 2000 and 2001, Afghanistan had the most reported landmines and unexploded ordnance casualties in the world" (86, 87). Individual injured by landmines and unexploded ordnance was such that 102 new injuries were reported each month. Children were more likely to be injured by unexploded ordnance, injuries among adults wear caused predominantly by landmines and about 81.2% of these injured wear civilian, 91.6 % wear men and boys and 45.9% wear younger than 16 years. Children wear mostly injured by grenades, bombs, motor shells and cluster munitions whereas adults wear injured mostly by landmines. There is another article which studied the rate of exposure to traumatic events; estimate prevalence rates of symptoms of post-traumatic stress disorder (PTSD), depression, and anxiety; identify resources used for emotional support and risk factors for mental health symptoms; in Nangarhar province, Afghanistan (88). They Designed, Settled A cross-sectional multi cluster sample survey of 1011 respondents aged 15 years or older, conducted during January and March 2003. They used different type of questionnaires for Post-traumatic stress disorder symptoms and traumatic events. They used the Harvard Trauma Questionnaire; depression and for general anxiety symptoms using the Hopkins Symptom Checklist; and resources for emotional support through a locally informed questionnaire. Results During the past 10 years, 432 respondents (43.7%) experienced between 8 and 10; 141 respondents (14.1%) experienced 11 traumatic events or more. High rates of symptoms of depression were reported by 391 respondents (38.5%); anxiety, 524 (51.8%); and PTSD, 207 (20.4%). Symptoms were more prevalent in women than in men and Higher rates of symptoms were associated with higher numbers of traumas experienced". Conclusions In this survey show a prevalence rates of having experienced multiple traumatic events and having symptoms of anxiety, depression, and PTSD were high. "Early in the 1980s, the Nangarhar province experienced heavy fighting between the previous Soviet Union army and the mujahideen forces. The cave complexes of Tora Bora, situated in Nangarhar's district Pachir wa Agam, used to be a center of mujahideen forces, where prisoners were interrogated and many were killed and later it was used by AlQaeda. In this study the Exposure A modification of the list of potential trauma events as recited in the HTQ is showing that the High percentages of the

participants reported having experienced multiple traumatic events about 40% reported experiencing 11 or more traumatic events, 71% percent experienced a lack of access to medical care, 69% experienced a lack of food or water and 67% percent indicated that they have been close to death over the past 10 years. The anxiety symptom scale results, estimated prevalence rates were 51.8% (21.9% in men and 78.2% in women). The HTQ yielded an estimated total prevalence of 20.4% for PTSD symptoms (7.5% in men and 31.9% in women). Resources for Emotional Support Ninety-eight percent (989) of the respondents mention Allah as the main resource for emotional support when feeling sad, worried, or tense. The second preferred resource was direct family members (812; 81.0%). Another article tell the story of a soldier for whom the blasts of landmines eventually became a kind of music. "Burt, who asks that his real name not be used, spent four months as a tactical adviser to a US military bomb-disposal unit in Afghanistan, during which he was within 50 meters of a detonating improvised explosive device (IED) more than 18 times (89). His sleeping problems began even before he left Afghanistan. He had headaches, nausea, the ringing in his ears and he started to forget things. The problem got even worse after he returned home. Burt would find himself in a room in his house and wonder why he was there. One time, he told his wife they should try a new restaurant in town. She replied that they had eaten there with friends just a few days before. Recently as two years ago, he have been diagnosed as a classic case of post-traumatic stress disorder (PTSD), a psychological condition that can be caused by the constant stress of being in combat. In the ten years since military operations began in Afghanistan, IEDs have killed more than 3,000 US and allied troops, and wounded roughly ten times that number". The troops often report an array of symptoms, ranging from sleep disturbance to problems concentrating and Further health consequences could be traumatic brain injury (TBI) that increase risk of disease like Alzheimer's or Parkinson's is soaring. Another article studies the health consequences of war with displacement of populations and TB effects on poor people. In the armed compact zones due to displacement of populations risk of disease transmission increased (90). Armed conflicts can bring both disability and death. Resource-poor countries with war are more prone to high morbidity, mortality and economic downtrends. Afghanistan as a low-income country has experienced conflicts, post-conflicts, as well as renewal of conflicts which all above factors lead to increase of TB (91). Another article study Malaria in Afghanistan. Malaria is often a major health problem in war-torn countries and Insecticide-treated nets (ITN) represent one of the few options for obtaining protection against malaria in unstable settings deficient in health infrastructure (92). Malaria is a major cause of morbidity and mortality in tropical countries affected by conflict (93). During the acute phase of the crisis, when populations may be forced to evacuate conflict zones, mortality rates because of malaria may grow alarmingly". Many past and recent conflicts have caused massive migrations to neighboring countries where refugee camps have been established to provide basic shelter and food. These refugee camps are more prone to malaria (94). Malaria has become a major health problem in many areas of Afghanistan over the last 20 years (95).

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