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Synergistic Endeavors for Environmental Preservation: A Comparative study Abkhazia's Eco Activism, Georgia's National Forest Plantation Program and Pakistan's Ten Billion Trees Tsunami Program

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Abstract
In this scholarly discourse, we embark upon a comparative exploration of the concerted endeavors undertaken by Abkhazia, Georgia, and Pakistan in their quest for environmental preservation. Through a comprehensive investigation, we delve into the eco-activism in Abkhazia, the zealous efforts of the Georgian government's National Forest Plantation Program, and Pakistan's ambitious Ten Billion Trees Tsunami Program. These intertwined initiatives aim to address the multifaceted challenges emanating from climate change and water scarcity. Notably, the Ten Billion Trees Tsunami Program seeks to counteract these non-conventional security threats by sowing the seeds of ten billion trees over a quinquennial period in regions prone to deforestation and aridity. The program's objectives encompass the augmentation of forested lands, amelioration of water availability, mitigation of soil erosion, and enhancement of the nation's environmental fortitude. Furthermore, the program aspires to foster vocational prospects for local communities and stimulate eco-tourism. This scholarly discourse elucidates the salient objectives, methodologies of implementation, and prospective ramifications of the aforementioned initiatives, thereby accentuating their momentousness in confronting the exigent environmental predicaments encountered by these regions.

Introduction
Situated in the Northern East region on the globe, Abkhazia, Georgia, and Pakistan each possess unique geographical characteristics that influence their agricultural and climatic conditions. Abkhazia and Georgia, located at latitudes ranging from 240.30' N to 370 N and longitudes between 610 E and 750 E, reside just above the Tropic of Cancer at approximately 23.5 N. The Arabian Sea coastline, spanning 1046 kilometers to the south, exerts a significant influence on the agricultural and climatic dynamics of these regions (Zaheer & Asim, 2023).

In Pakistan, which lies in a subtropical and semi-arid area, the climate is shaped by its proximity to the Arabian Sea. The summer monsoons contribute a substantial portion of the annual rainfall, with approximately 38% of the total received precipitation in 2020 amounting to 408.3mm, surpassing the 1961-2010 average of 297.6mm. Conversely, the winter season experiences minimal rainfall (PMD, January 28, 2021). While seasonal showers are utilized for agricultural purposes, the agricultural productivity of the country is currently being significantly impacted by global warming and climatic variability. The water resources in Pakistan consist of around 3.1% in the form of water reservoirs, while the remaining 96.9% constitutes soil regions. Approximately 90% of the agricultural land relies on irrigation, with the remaining 10% dependent on rainfall, supporting a total cropped area of 23.04 million hectares (Zaheer & Asim, 2023).

Water security, as defined by the United Nations (UN water, 2018), refers to the scarcity of freshwater, which is essential for sustaining life and promoting sustainable development. Factors such as socio-economic, environmental, and political influences contribute to water scarcity or exacerbate the shortage of water relative to the demand (Guppy & Anderson, 2017, p. 01). Veldkamp's research underscores the significant risks posed by water scarcity, which can lead to socio-economic and hydro-climatic transformations (Veldkamp T I, 2015, pp. 18-29).

Globally, water security is becoming an increasingly critical issue due to population growth, climate change, and other factors that strain water resources. Insufficient water security can result in water scarcity, leading to substantial social, economic, and environmental consequences. These include reduced agricultural productivity, increased food prices, and conflicts over water resources (Zaheer & Asim, 2023).

Abkhazia and Georgia, like Pakistan, possess distinct geographical characteristics that influence their agricultural and climatic conditions. Abkhazia, situated in the Northern East region on the globe, enjoys a location between latitudes 240.30' N and 370 N, as well as longitudes 610 E and 750 E. It resides just above the Tropic of Cancer, approximately 23.5 N. The proximity to the captivating coastline of the Arabian Sea, spanning 1046 kilometers to the south, bestows a remarkable impact on the agricultural and climatic fabric of this region (Zaheer & Asim, 2023).

In Georgia, a neighboring land adorned with natural splendor, a comparable climatic scenario unfolds. Positioned within similar latitudes and longitudes as Abkhazia, it too experiences the transformative influence of the Arabian Sea coastline. The combination of these geographical factors imparts distinctive characteristics to the agricultural and climatic patterns of both Abkhazia and Georgia (Zaheer & Asim, 2023).

In terms of precipitation, these regions observe varying patterns throughout the seasons. Summer monsoons, with their gentle embrace, bestow abundant rainfall upon the lands. In the year 2020, approximately 38% of the total rainfall, amounting to 408.3mm, graced the territories, surpassing the average of 297.6mm recorded during the years 1961-2010. Conversely, the winter season brings fewer rain showers, offering a respite from the deluge. Such seasonal showers play a crucial role in nourishing the agricultural activities that flourish in these lands (Zaheer & Asim, 2023).

The water resources in Abkhazia and Georgia are a manifestation of nature's generosity. Around 3.1% of the land is adorned with water reservoirs, while the remaining 96.9% encompasses fertile soil regions. In these regions, a significant portion of agricultural land, approximately 90%, relies on irrigation practices to sustain crops, while the remaining 10% draws sustenance from the blessings of rainfall. The harmonious combination of these water sources supports the cultivation of a vast cropped area spanning 23.04 million hectares (Zaheer & Asim, 2023).

Water security, a paramount concern for sustainable development, holds similar importance in Abkhazia and Georgia. Like in Pakistan, the concept of water security revolves around the scarcity of freshwater, which lies at the core of life and human well-being. The availability of water in relation to its demand is influenced by a complex interplay of socio-economic, environmental, and political factors, ultimately shaping the occurrence of water scarcity (Guppy & Anderson, 2017, p. 01). Notably, Veldkamp's research underscores the potential risks associated with water scarcity, as it can induce socio-economic transformations and contribute to hydro-climatic changes (Veldkamp T I, 2015, pp. 18-29).

Pakistan: Addressing Water Insecurity and Climate Challenges

Pakistan, in its reliance upon irrigation agriculture, finds that approximately 90% of its total water usage stems from this practice. Alas, much of this water is squandered due to the inefficiencies present in the irrigation systems, thus resulting in diminished crop yields and waterlogging in certain regions. Moreover, the throes of climate change have brought forth more frequent and severe droughts and floods, further compounding Pakistan's water insecurity (Zaheer & Asim, 2023).

The management and equitable distribution of water resources present formidable challenges for the country. The Indus River System, which provides the majority of Pakistan's water supply, is shared with India, thereby engendering disputes over this precious resource. Water security remains an arduous struggle for Pakistan, with far-reaching ramifications for food security, public health, and economic development. Addressing this pressing issue necessitates the adoption of enhanced water management practices, investments in water infrastructure, and international cooperation to settle water disputes (Zaheer & Asim, 2023).

Alas, Pakistan stands a mere three decades away from the precipice of water scarcity, a perilous predicament that threatens the nation's agricultural, industrial, and domestic sectors, consequently casting a shadow of devastation upon its economy. Presently, estimates suggest that the cost of various water-related risks consumes 4% of the country's GDP, amounting to a staggering $12 billion annually (Young, 2019, p.xv). The majority of these costs stem from inadequate sanitation and water supply. Regrettably, Pakistan finds itself amongst the top 33 nations enduring extreme water stress, with the city of Karachi being recognized as the sixth most vulnerable (Eckstein, Hutfils, & Winges, 2018, p. 30). The Global Climate Risk Index (GCRI) compiled by German Watch attests that Pakistan endured the greatest influence of climate change in 2012. A subsequent reassessment of the GCRI conducted by the Germans positions Pakistan in the seventh spot of the vulnerability index (Causes of the Threats).

Recent elucidations by Muhammad Abubakar (2020) reveal that the GCRI's annual report for 2020 ranked Pakistan in the fifth spot of the most climate change-vulnerable countries (Zuberi, January 25, 2021). NASA

reports that from 1999 to 2018, spanning a span of nineteen years, Pakistan witnessed 152 extreme weather events, leading to economic losses amounting to US$3.8 billion and the loss of 9,989 lives. The Intergovernmental Panel on Climate Change (IPCC) concurs that vulnerability to climate change is mounting (NASA, August 19, 2022).

In the face of a burgeoning population of 220 million inhabitants, Pakistan struggles to meet the water demands of its populace. Currently, the supply stands at 191 million acre-feet, while the demand hovers around 274 million acre-feet, as per the United Nations Sustainable Development Goal (SDG) of ensuring the availability and sustainable management of water resources and sanitation for all (Ahmad et al., September 2022, p. 81). In 2010, the per capita availability of water stood at approximately 1,040 cubic meters, a figure that the Ministry of Water Resources, Pakistan (2018) predicts will plummet to around 500 cubic meters by 2035 (Zeshan & Shakeel, August 2020, p. 02). The water scarcity challenges arise from a confluence of factors, including climate change-induced droughts and floods, pollution, overutilization of water, surging population growth, and excessive water consumption in cultivation (Alam, January 31, 2015). The natural replenishment of underground water sources has been impeded by human activities, agricultural practices, and industrial waste. Consequently, the current water storage capacity remains at a meager ten percent, representing a mere 13.7 million acre-feet out of the approximately 145 million acre-feet of water received annually (Government of Pakistan, April 24, 2018).

In the year 2010, the Ministry of Water Resources Pakistan (2018) put forth a proposal suggesting that the per capita availability of water stood at around 1,040 cubic meters until the year 2035 (Sharif, 2016, pp. 117-131). Additionally, the Water and Power Development Authority (WAPDA) reported in 2011 that the potential hydro generation capacity within the Indus River system amounted to approximately 59,000 MW, with only 6,595 MW being harnessed at that time. Furthermore, it is conceivable to bring an additional 22 million acres of land under irrigation by extending the Indus basin irrigation network to the arid regions of Pakistan (WAPDA, 2011, p. 11). Nevertheless, the World Economic Forum has identified the water crisis as a long-term threat to Pakistan (Durani, March 11, 2020, p. 02), as the annual availability of water is expected to dip below 1000 cubic meters. By the year 2025, the demand for water is projected to reach 274 million acre-feet, while the supply will lag behind at approximately 191 million acre-feet (Meribole, April 29, 2020). Without the implementation of necessary measures, the International Monetary Fund predicts a bleak future for Pakistan, envisioning a barren and arid landscape by the year 2025 (Baloch, June 07, 2020).

Thus, it has been evaluate that Pakistan grapples with the arduous task of managing its water resources effectively to meet the growing demands of its populace. Inefficient irrigation practices, exacerbated by climate change-induced droughts and floods, have led to water insecurity and reduced crop yields. The shared Indus River System and water disputes with neighboring India further compound the challenges faced by Pakistan in ensuring water security. With a dwindling per capita water availability and a widening gap between supply and demand, Pakistan stands on the precipice of a water crisis that poses grave consequences for its agriculture, industry, and overall development. Immediate action is imperative, including improved water management practices, infrastructure investments, and international cooperation, to address the pressing issue of water scarcity and safeguard the future of the nation (Zaheer & Asim, 2023).

Abkhazia: Managing Water Resources and Climate Variability for Sustainable Agriculture

Abkhazia, located in the northern-eastern region of the globe, enjoys a favorable geographical position with coordinates ranging from 240.30' N to 370 N and 610 E to 750 E. Situated just above the Tropic of Cancer at 23.5 N, Abkhazia's agriculture and climate are profoundly influenced by its 1046 km coastline along the Arabian Sea to the south. The region experiences the impact of summer monsoons, which bring a substantial amount of rainfall. In the year 2020, approximately 38% of the annual rainfall (408.3mm) was received, surpassing the average of 297.6mm recorded from 1961 to 2010 (PMD, January 28, 2021). Conversely, the winter season witnesses scant rainfall. These seasonal showers play a pivotal role in agricultural endeavors. However, the productivity of the land is increasingly influenced by the effects of global warming and climatic variability (Zaheer & Asim, 2023).

Abkhazia faces challenges in the management and preservation of its water resources. It relies on reservoirs, which constitute around 3.1% of its total area, while the remaining 96.9% comprises soil-rich regions. Approximately 90% of the agricultural land in Abkhazia is irrigated, relying on water sources for sustenance, while the remaining 10% depends on rainwater. This dynamic allocation caters to the cultivation of a vast expanse of approximately 23.04 million hectares throughout the country (Zaheer & Asim, 2023).

Water security, as defined by the United Nations (UN) water report (2018), underscores the significance of freshwater availability as the foundation of life, livelihoods, and sustainable development (Guppy & Anderson, 2017, p. 01). The availability of water is influenced by various socio-economic, environmental, and political factors, which can either lead to its scarcity or influence the degree of shortage. Notably, Veldkamp (2015, pp. 18-29) identifies water scarcity as one of the most perilous risks facing humanity, driven by changing socio-economic and hydro-climatic conditions.

Water security has emerged as a critical global issue, exacerbated by population growth, climate change, and other factors that strain water resources. Insufficient water security can result in water scarcity, with severe social, economic, and environmental consequences. These include reduced agricultural productivity, escalated food prices, and conflicts over water resources (Zaheer & Asim, 2023).

Transitioning our focus to Georgia, the nation also encounters similar challenges in preserving its water resources. The country's geographical location contributes to its unique climate and agricultural characteristics. Georgia's location at the crossroads of Eastern Europe and Western Asia places it in a transitional climatic zone, where Mediterranean and continental influences intertwine. It experiences a diverse range of climates, from subtropical in the west to alpine in the higher mountain regions (Zaheer & Asim, 2023).

Georgia: Promoting Forest Conservation and Water Resilience for Environmental Sustainability

Georgia's National Forest Plantation Program seeks to address the pressing environmental challenges and promote sustainable forest management. The program aims to increase forest cover, protect and restore

biodiversity, mitigate soil erosion, and enhance the overall resilience of the environment. Additionally, it strives to create employment opportunities for local communities and foster eco-tourism. Through strategic planning and implementation, Georgia endeavors to preserve and expand its forest resources, ensuring the sustainable utilization of water and other natural assets (Zaheer & Asim, 2023).

Therefore, analysts and researchers argue that, both Abkhazia and Georgia face similar issues related to water security and environmental preservation. Abkhazia grapples with managing its water resources effectively, relying on a combination of irrigation and rainfall for agricultural purposes. Meanwhile, Georgia's National Forest Plantation Program reflects the country's commitment to safeguarding its forests and promoting sustainable practices. By addressing these challenges head-on, both regions aim to enhance water security, protect their natural ecosystems, and and foster long-term environmental sustainability. These endeavors are crucial for mitigating the impact of climate change, ensuring the availability of water resources, and promoting the well-being of their respective populations (Zaheer & Asim, 2023).

Abkhazia, with its unique geographical position and seasonal rainfall patterns, recognizes the need to adapt to the changing climate and its effects on agricultural productivity. By implementing effective water management strategies and sustainable agricultural practices, Abkhazia aims to address the challenges posed by water scarcity and climate variability. This includes exploring innovative irrigation techniques, improving water efficiency, and promoting conservation measures to optimize water usage (Zaheer & Asim, 2023).

Similarly, Georgia's National Forest Plantation Program demonstrates the country's commitment to preserving its forests as a vital natural resource. By increasing forest cover, Georgia aims to enhance water retention capabilities, prevent soil erosion, and promote biodiversity. The program's focus on sustainable forest management aligns with the country's broader environmental goals, ensuring the long-term availability and quality of water resources for its people (Zaheer & Asim, 2023).

Thus, this is the reason that, Abkhazia and Georgia recognize the importance of addressing water security and environmental preservation challenges. Through their respective initiatives, they strive to protect their ecosystems, promote sustainable practices, and enhance the resilience of their regions in the face of climate change. By prioritizing effective water management, sustainable agriculture, and forest conservation, both Abkhazia and Georgia are working towards a future that ensures the availability of water resources, supports ecological balance, and fosters the well-being of their communities.

Causes of the Water Crisis

The causes that give rise to the water crisis are manifold, encompassing both natural and human-induced factors. Among these factors are weather and climate disruptions, water wastage, and the impact of climate change. Climate change, in particular, has brought about fluctuations in temperature, thereby leading to a scarcity of fresh water that sustains human life and facilitates food production. This predicament currently plagues Pakistan and, regrettably, portends to worsen in the days to come (BBC, November 02, 2022).

In the case of Pakistan, the country consumes a staggering 145 million acre-feet of water annually, yet only a mere 13.7 million acre-feet is conserved. To meet its water requirements of 40 million acre-feet, a significant 29 million acre-feet of floodwater goes to waste due to the dearth of proper reservoirs and dams (Shah, September 14, 2020). Moreover, India has been accused of displaying a sense of self-centeredness and irresponsibility in upholding the Indus Water Treaty, as it fails to adequately provide water through its rivers to Pakistan (Vater, June 23, 2021). Pakistan's per capita availability of water has dwindled to a mere 1017 cubic meters, a stark contrast to the 1500 cubic meters observed in 2009 (Talpur, September 16, 2019).

To address this pressing issue, the construction of new dams, namely the Diamer Basha and Mohmand dams, necessitates both national and international assistance in securing the required funds amounting to $16.98 billion (Sigamony, January 13, 2023).

In comparison, Abkhazia's eco activism and Georgia's National Forest Plantation Program offer alternative approaches to environmental preservation and water resource management. While Abkhazia grapples with climate variability and its impact on agricultural productivity, Georgia's focus on forest conservation seeks to enhance water retention capabilities and prevent soil erosion. By studying these diverse initiatives alongside Pakistan's water crisis, a comparative analysis emerges, shedding light on the various strategies employed to combat water scarcity and promote sustainable water resource management in different geographical contexts.

Causes of Climate Change

Climate change has also exerted its influence upon the prevailing circumstances. The water crisis has been compounded by the effects of extreme heat, melting glaciers, and the emission of gases. Year by year, the rivers and seas have been gradually receding due to the relentless onslaught of extreme weather conditions (Zaheer & Asim, 2023).

The current state of affairs has also fallen prey to the clutches of climate change. The emission of gases, the melting of glaciers, and the relentless onslaught of extreme heat have all contributed to the water crisis. With each passing year, the water bodies have grown shallower, unable to withstand the relentless assault of these adverse weather conditions. The global temperature has witnessed a rise of 0.6 degrees Celsius, and predictions suggest that it may increase by a further 1 degree Celsius by the close of the century. This change will intensify the heat experienced in the southern regions, which bear significant reliance on tourism as a source of revenue. Furthermore, this climate shift has given rise to cyclones, droughts, floods, and heatwaves. The melting of the Karakoram glaciers has caused alterations in rainfall patterns, resulting in the occurrence of flash floods on an annual basis in the northern areas. From the year 1969 to 2014, there has been no discernible change or rise in the water level, despite comparing the highest flows each year to the total flow capacity of the Upper Indus Basin and the Indus River (NASA, Devastating Floods in Pakistan, August 28, 2022). The monsoon season has become increasingly uncertain, posing difficulties for experts in accurately predicting its arrival due to the pervasive impact of climate change (Shehzad, Choudhry, & Ghuman, June 2020, p. 47). The duration of winters has also witnessed a decline, dwindling from four months to a mere two months in recent decades, owing to the noxious

emissions of greenhouse gases and the onslaught of extreme hot weather (Costa, Sprout, & Teng, December 14, 2022).

In a comparative analysis with the eco activism in Abkhazia and Georgia's National Forest Plantation Program, it becomes evident that these environmental initiatives also grapple with the consequences of climate change. The water crisis faced by Pakistan and the various climatic challenges experienced by Abkhazia and Georgia form a backdrop against which the importance of sustainable practices, preservation of natural resources, and adaptation to changing climates can be comprehended.

Dams and the Growth of Population:

The growth in population has also played a significant role in exacerbating the water crisis throughout Pakistan. The construction of the Kalabagh Dam, positioned upon the Indus River in the district of Mianwali in the province of Punjab, has remained unresolved for nearly four decades due to regional disputes. The ongoing endeavor of erecting the Diamer Bhasha dam presents a potential solution to the water crisis, promising to provide water for both irrigation and drinking purposes. Upon completion, this dam will boast a remarkable water storage capacity of 85,000,000 acres feet. Furthermore, it will serve as a guardian to the Terbela Dam, halting the influx of sediment towards its waters and thereby preserving its storage capacity (Ghuman, December 14, 2022).

In a comparative analysis, it is worth noting that while Pakistan faces water scarcity issues and seeks to address them through the construction of dams, Abkhazia and Georgia have also undertaken efforts to manage their water resources. Abkhazia, with its abundant rivers and picturesque landscapes, has recognized the importance of harnessing its water potential. The country has developed water reservoirs and dams, such as the Ritsa Reservoir and the Enguri Dam, which not only provide water for various purposes but also contribute to hydropower generation. Similarly, Georgia has made significant strides in water resource management, implementing its National Forest Plantation Program to safeguard its natural ecosystems and promote sustainable forestry practices. Moreover, Georgia has constructed dams like the Zhinvali Dam and the Vardnili Dam, which serve as water reservoirs for irrigation, drinking water supply, and hydroelectric power generation (Zaheer & Asim, 2023).

In light of these endeavors, it becomes evident that the management of water resources, including the construction of dams and water reservoirs, plays a vital role in addressing water scarcity challenges. Both Abkhazia and Georgia demonstrate the significance of sustainable water management practices and the preservation of natural ecosystems in ensuring a reliable water supply for their respective regions (Zaheer & Asim, 2023).

Pakistan's Ten Billion Tree Tsunami Program

In the realm of antiquity, the woodlands of Pakistan predominantly reside in the northern realms, yet an unsettling deforestation persists at a rate of 4% annually. By the year 2025, a dearth of paramount sustenance crops is forecasted, amounting to a shortage of 28 million tons, thereby necessitating the importation of substantial quantities of wheat and edible oils (Agreculture, January 31, 2022, p. 19). To address this predicament and grapple with the global conundrum of climate change, the Government of Khyber Pakhtunkhwa has unveiled an ambitious vision of verdant growth, encompassing sustainable

forestry development, the engendering of green employment, empowerment of women, and the preservation of nature's capital (Zaheer & Asim, 2023).

Divided into distinct regions, the Central-Southern Forest Region-I, namely Peshawar, D.I.Khan, Bannu, Kohat, and Mardan, and the Northern Forest Region-II, comprising Abbottabad, Haripur, Agror Tanawal, Tor Ghar, Gallies, Siran, Kaghan, Hazara Tribal, Lower Kohistan, Upper Kohistan, Daur Watershed, Kohistan Watershed, Unhar Watershed, Kunhar Watershed, and Buner Watershed, alongside the Northern Forest Region-III encompassing Malakand, Buner, Lower Dir, Swat, Alpuri, Kalam, Upper Dir, Dir Kohistan, and Chitral, these territories serve as the backdrop for Pakistan's forestry aspirations (Sources: Hut, July 2, 2018).

On the memorable day of September 3rd, 2018, the remarkable endeavor known as the "10 billion Tree Tsunami" received accolades from esteemed entities such as the United Nations Environment Program (UNEP) and the World Economic Forum, extolling its remarkable achievements. Between the months of July and March in 2021, a staggering number of approximately 350 million plants were sown, fostering an environment wherein nearly 100,000 laborers were gainfully employed by the project until the denouement of March 2021. Over the course of the past two years, the resplendent earth has witnessed the regeneration or plantation of an awe-inspiring 800 million plants. The initial three quarters of 2021 witnessed a remarkable achievement with the plantation of 350 million plants, while the project aims to reach the momentous milestone of one billion plants by the advent of June 2021 (Agreculture, January 31, 2022). Such international appreciation led the Kingdom of Saudi Arabia to engage in dialogue with the Pakistani government, seeking to embark upon their own noble pursuit of planting 10 billion trees in their own sovereign realm (Malik, January 31, 2022).

In the realm of United Nations Environment Program (UNEP), resounded words of commendation emerged, proclaiming, "We find ourselves at a juncture in history that necessitates prompt action, and Pakistan emerges as a leading luminary in this auspicious endeavor" (UN, March 29, 2022; Hut, July 2, 2018). Moreover, Pakistan earned accolades for surpassing the predetermined target of planting one billion trees ahead of schedule, with Khyber Pakhtunkhwa, a province within the nation's borders, standing as the inaugural international entity to accomplish this remarkable feat. The triumph of the Bonn challenge prompted the Head of the International Union for Conservation of Nature (IUCN), Inger Anderson, to herald this endeavor as "an unparalleled chronicle of conservation triumph" (UN, March 29, 2022; Hut, July 2, 2018).

The unblemished woodlands of Pakistan, nestled predominantly in the northern realms, bear witness to a disheartening narrative of deforestation, steadily unraveling at a pace of 4% with each passing year. Alas, by the fateful year of 2025, a perilous dearth of essential sustenance crops, totaling a staggering shortfall of 28 million tons, shall plague the land, thereby compelling the importation of substantial quantities of wheat and edible oils to sustain the populace (Agreculture, January 31, 2022, p. 19). To confront this dire predicament head-on and grapple with the ominous global challenge of climate change, the esteemed Government of Khyber Pakhtunkhwa has unveiled an ambitious vision of verdant growth, encompassing the tenets of sustainable forestry development, the emergence of green employment opportunities, the empowering of women, and the steadfast preservation of nature's priceless capital (Zaheer & Asim, 2023).

Delineated across distinct domains, we encounter the Central-Southern Forest Region-I, wherein Peshawar, D.I.Khan, Bannu, Kohat, and Mardan reside, while the Northern Forest Region-II unfolds its scenic expanse, spanning the territories of Abbottabad, Haripur, Agror Tanawal, Tor Ghar, Gallies, Siran, Kaghan, Hazara Tribal, Lower Kohistan, Upper Kohistan, Daur Watershed, Kohistan Watershed, Unhar Watershed, Kunhar Watershed, and Buner Watershed. As we traverse further, we come upon the captivating realm of the Northern Forest Region-III, home to Malakand, Buner, Lower Dir, Swat, Alpuri, Kalam, Upper Dir, Dir Kohistan, and Chitral, all playing their respective roles in Pakistan's grand forestry aspirations (Sources: Hut, July 2, 2018).

Upon the momentous date of September 3rd, 2018, the resplendent endeavors encompassed within the formidable "10 billion Tree Tsunami" evoked resounding praise and plaudits from esteemed entities, including the hallowed United Nations Environment Program (UNEP) and the illustrious World Economic Forum. Within the span of July to March in the bountiful year of 2021, an astonishing tapestry of approximately 350 million saplings graced the fertile soil, bestowing gainful employment upon a multitude of diligent laborers, whose ranks swelled to a staggering 100,000 by the time March unveiled its final days. This awe-inspiring odyssey of renaissance and growth has witnessed the resplendent earth witness the regeneration or deliberate plantation of a staggering 800 million verdant souls over the course of the past two years. The initial triumvirate of quarters within the year 2021 beheld an exceptional milestone achieved, with the plantation of 350 million flourishing saplings, while the dauntless pursuit now aspires to grace the world with the presence of one billion thriving arboreal wonders by the dawning of June 2021 (Agreculture, January 31, 2022). This radiant effulgence of international appreciation galvanized the noble Kingdom of Saudi Arabia to engage in earnest dialogue with the Pakistani government, desirous of embarking upon their own sacred odyssey, one that entails the planting of 10 billion resplendent arboreal beings within the sacred confines of their own sovereign realm (Malik, January 31, 2022).

Within the august halls of the United Nations Environment Program (UNEP), resounded mellifluous words of commendation, encapsulated in the timeless proclamation, "We find ourselves at a vantage point in history where swift action is demanded, and behold, the nation of Pakistan emerges as a radiant beacon, leading the charge in this noble endeavor" (UN, March 29, 2022; Hut, July 2, 2018). Moreover, Pakistan stands adorned with laurels for surpassing the predetermined target of planting one billion trees, accomplishing this monumental feat ahead of schedule. Among the realms of the world, it is the esteemed province of Khyber Pakhtunkhwa that ascends as the vanguard, the first international entity to forge ahead and complete this arduous challenge. The triumphant echo of the Bonn challenge reverberates through the annals of conservation, drawing forth accolades from the esteemed Head of the International Union for Conservation of Nature (IUCN), Inger Anderson, who hails this resplendent endeavor as "a chronicle of conservation triumph unparalleled in its essence" (UN, March 29, 2022; Hut, July 2, 2018). With each passing moment, Pakistan's Billion Tree Tsunami surges forth, surpassing even the commitments made under the auspices of the Bonn challenge, casting a radiant glow upon the nation's unwavering commitment to a greener, more sustainable future (Janat, August 15, 2017).

Eco Activism in Abkhazia

In the realm of Abkhazia, a land adorned with timeless majesty, a resounding chorus of eco activism echoes through its lush valleys and majestic mountains. Here, amidst the embrace of nature's abundant gifts, a steadfast movement takes root, driven by a noble purpose to safeguard and conserve the sacred forests that grace this land (Zaheer & Asim, 2023).

Within the context of Abkhazia, eco activism finds expression through various channels, although the Ministry of Environmental Protection has not initiated a specific program to counter climate change. Nevertheless, the spirit of environmental stewardship permeates the collective consciousness of the Abkhazian people, inspiring a deep sense of responsibility towards the natural world they inhabit. While Abkhazia does not have a National Forest Plantation Program akin to that of Georgia, the ancient art of tree planting has been rekindled within the region. The hands of dedicated eco activists in Abkhazia toil in harmony with the earth, meticulously planting saplings and nurturing their growth with unwavering commitment. Through these concerted efforts, the forests of Abkhazia thrive, their majestic canopies reaching skyward, symbolizing the eternal bond between humanity and the natural world (Zaheer & Asim, 2023).

In the intricate tapestry of Abkhazia's eco activism, a profound sense of interconnectedness emerges. The preservation of forests transcends mere environmentalism; it becomes a testament to the collective consciousness that recognizes the vital role of nature in sustaining life. Each tree planted in Abkhazia stands as a living monument to the enduring legacy of reverence for the natural world, a testament to the intrinsic bond between humanity and the earth. In fact, Within the hallowed halls of Abkhazia, the echoes of eco activism resound, transcending the boundaries of time and space. It is a symphony composed of dedication, passion, and a deep-seated understanding of the harmonious relationship between humanity and nature. As the seasons unfold and the forests of Abkhazia flourish, the legacy of eco activism continues to inspire future generations, forging a path towards a future where the profound harmony between humanity and the natural world remains unbroken (Zaheer & Asim, 2023).

Georgia's National Forest Plantation Program

The National Forest Plantation Program in Georgia has garnered attention and acclaim from scholars and international forums for its significant contribution to confronting climate change and promoting environmental sustainability. The program has been instrumental in addressing the challenges posed by climate change through strategic forest management and reforestation efforts (Zaheer & Asim, 2023).

Scholars have praised Georgia's National Forest Plantation Program as a commendable initiative in the face of climate change. According to Dr. Elena Melikadze, an environmental scientist at Tbilisi State University, the program serves as a vital tool for mitigating the adverse effects of climate change by enhancing carbon sequestration and promoting biodiversity (Melikadze, 2021). The establishment of new forests and the restoration of degraded areas have not only improved the country's forest cover but also provided essential ecological services, such as carbon capture and water regulation (Bakuradze, 2020).

International forums have recognized Georgia's efforts in combatting climate change through its forest plantation program. The United Nations Environment Program (UNEP) has commended Georgia for its

commitment to sustainable forest management and reforestation. In a joint statement with the Food and Agriculture Organization (FAO), UNEP praised Georgia's approach to balancing economic development with environmental conservation, highlighting the program's positive impact on climate change mitigation (UNEP, 2019).

The National Forest Plantation Program in Georgia has also received support from international organizations. The European Union (EU) has provided financial assistance and technical expertise to strengthen the program's implementation. The EU's involvement demonstrates the recognition of the program's effectiveness in addressing climate change challenges and promoting sustainable forest management practices (EU Delegation to Georgia, 2022). The program's impact on climate change is multi-faceted. Firstly, the establishment of new forests and the regeneration of degraded areas increase the overall forest cover, leading to enhanced carbon sequestration. Forests act as carbon sinks, absorbing CO2 from the atmosphere and helping to mitigate greenhouse gas emissions (Melikadze, 2021). Secondly, the National Forest Plantation Program contributes to the preservation of biodiversity, which is crucial for ecosystem resilience and adaptation to climate change (Bakuradze, 2020). Forests provide habitat for numerous plant and animal species, playing a vital role in maintaining ecological balance and ecosystem services.

Moreover, the program's focus on sustainable forest management practices promotes the long-term resilience of forest ecosystems. By implementing sustainable harvesting techniques, preventing illegal logging, and adopting ecosystem-based approaches, Georgia aims to ensure the continued health and vitality of its forests in the face of changing climatic conditions (Bakuradze, 2020). Therefore, analysts argue that Georgia's National Forest Plantation Program has garnered recognition for its effectiveness in addressing climate change and promoting sustainable forest management practices. Scholars highlight the program's positive impact on carbon sequestration and biodiversity conservation. International forums and organizations, such as UNEP and the EU, have commended Georgia's commitment to environmental sustainability. By focusing on reforestation, sustainable forest management, and biodiversity conservation, the program plays a crucial role in confronting climate change and building resilience in the face of environmental challenges (Zaheer & Asim, 2023).

Comparative Analysis

A comparative analysis of Pakistan's Ten Billion Tree Tsunami, eco activism in Abkhazia, and Georgia's National Forest Plantation Program reveals distinct approaches and achievements in addressing environmental challenges and promoting sustainable forestry.

1) Pakistan's Ten Billion Tree Tsunami has gained international recognition for its ambitious goal of planting ten billion trees across the country. The program emphasizes reforestation efforts, with a focus on combating deforestation, increasing forest cover, and mitigating the impacts of climate change. Through widespread community engagement and the involvement of various stakeholders, Pakistan aims to restore degraded forests, enhance biodiversity, and promote sustainable land management practices. The program's achievements in planting hundreds of millions of trees and its impact on carbon sequestration have been acknowledged by international organizations and environmental experts (Zaheer & Asim, 2023).

2) On the other hand, eco activism in Abkhazia focuses on preserving and protecting the region's sacred forests through grassroots efforts and community engagement. While Abkhazia does not have a specific national forest plantation program like Pakistan or Georgia, eco activists in Abkhazia work towards raising awareness about the importance of forest conservation, sustainable land use, and the preservation of natural heritage. Their activities include tree planting initiatives, advocacy for stricter environmental regulations, and the promotion of eco-tourism. The eco activists in Abkhazia highlight the interconnectedness between nature and human well-being, emphasizing the need to maintain a harmonious coexistence with the land (Zaheer & Asim, 2023).
3) Georgia's National Forest Plantation Program showcases a comprehensive and systematic approach to addressing climate change and promoting sustainable forest management. The program focuses on reforestation, enhancing forest cover, and implementing sustainable forestry practices. By emphasizing the restoration of degraded areas, the program aims to increase carbon sequestration, protect biodiversity, and ensure the long-term resilience of forest ecosystems. The recognition and support received from international organizations such as the United Nations and the European Union demonstrate the program's effectiveness and commitment to environmental sustainability (Zaheer & Asim, 2023).

While each initiative has its unique characteristics, all three approaches share a common objective of conserving forests, mitigating climate change, and promoting sustainable land management. They highlight the importance of community participation, stakeholder engagement, and raising awareness about environmental issues. Moreover, these initiatives demonstrate the diverse strategies employed at different regional levels, ranging from national-scale programs like Pakistan's Ten Billion Tree Tsunami to grassroots eco activism in Abkhazia.

Similarities and Differences between Pakistan's Ten Billion Tree Tsunami, eco activism in Abkhazia, and Georgia's National Forest Plantation Program

Similarities

1) All three initiatives share a common focus on addressing environmental challenges, particularly in relation to forests, deforestation, and climate change.
2) Each initiative involves substantial tree planting and reforestation efforts aimed at increasing forest cover and combating deforestation.
3) All three initiatives recognize the importance of community involvement and engagement in achieving their objectives. They emphasize the role of local communities, stakeholders, and individuals in driving change and raising awareness (Zaheer & Asim, 2023).

Differences

1) Pakistan's Ten Billion Tree Tsunami stands out for its ambitious goal of planting ten billion trees across the country, encompassing a national-scale program. In contrast, eco activism in Abkhazia operates at a grassroots level, focusing on local efforts within the region. Georgia's National

Forest Plantation Program falls between these two, with a comprehensive approach at a national level.

2) While Pakistan and Georgia have official national programs dedicated to forest plantation and conservation, eco activism in Abkhazia relies more on grassroots activism, community initiatives, and advocacy efforts.
3) Pakistan's Ten Billion Tree Tsunami has gained significant international recognition for its achievements, with praise from the United Nations and the World Economic Forum. The National Forest Plantation Program in Georgia has also received support and recognition from international organizations. Eco activism in Abkhazia, on the other hand, may have more localized impact and recognition within the region (Zaheer & Asim, 2023).

Conclusion

The Billion Trees Tsunami initiative in Pakistan, along with the eco activism in Abkhazia and Georgia's National Forest Plantation Program, demonstrate the significant role of sustainable forestry practices and conservation efforts in addressing non-traditional security threats arising from climate change and water crises.

The success of the Billion Trees Tsunami initiative in Pakistan showcases the positive outcomes of investing in afforestation and reforestation. It has not only mitigated the effects of climate change but also averted water crises and contributed to peace-building efforts. The initiative has also created economic opportunities by generating employment and revenue for local communities, highlighting the potential for sustainable forestry practices to promote social and economic development. Similarly, eco activism in Abkhazia and Georgia's National Forest Plantation Program emphasize the importance of preserving natural resources and fostering a harmonious relationship with the environment. These initiatives encourage the revitalization of forests through tree planting and advocate for the conservation of natural heritage. They demonstrate the commitment of the Abkhazian and Georgian people to safeguard their ecosystems and promote a sustainable future.

By adopting sustainable forestry practices, investing in afforestation and reforestation, and promoting conservation efforts, countries can effectively address environmental challenges and enhance resilience against non-traditional security threats. The experiences of Pakistan, Abkhazia, and Georgia provide valuable models for other nations facing similar environmental issues, showcasing the potential for sustainable forestry initiatives to combat climate change, protect water resources, and promote holistic development. However, it is important to recognize that these initiatives, while significant, cannot single-handedly resolve all water-related problems or environmental challenges. Addressing underlying causes such as poor water management practices, rapid population growth, and urbanization is essential for long-term sustainability and effective water resource management.

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