



Climate Action Scenarios and the Future of Afghanistan's Sustainable Development

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Abstract

Afghanistan is one of the countries affected by the climate change. Integrating climate measures and sustainable development goals can improve Afghanistan's future prospects. Climate change leads to lack of water and food, disease, unemployment, etc. Migration, poverty, tensions in resources, and instability in Afghanistan and the world. This study identifies climate action companies for Afghanistan's sustainable development. Descriptive-analytical method and using climate data and models to investigate the main strategies in the field of adaptation and reduction of climate change effects in Afghanistan. Sustainable development assumptions contain four global 2050 climate change scenarios which is presented by the Joint Research Center (JRC), Science Service and the knowledge of the European Commission in 2021. Climate change scenarios and the future of sustainable development in Afghanistan in 2050 are categorized as: 1. First scenario: Dream Afghanistan; 2. Second scenario: Afghanistan on the way to sustainability; 3. Third scenario: unstable Afghanistan; 4. Fourth scenario: Afghanistan in difficult conditions. Afghanistan's climate change strategy and action plan should be urgently finalized and implemented as a primary step towards mainstreaming climate change into national development plans.

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Introduction

The phenomenon of climate change has many negative effects on various systems, such as water resources, environment, industry, health, agriculture, and all systems that interact with the climate system (Esmailnejad, 2022). Climate change is one of the 15 challenges of the world and one of Afghanistan's seven main challenges (World Bank, 2014). Enhancing in temperature of the world caused by the increase in greenhouse gas concentration and land use change, causing obvious changes in Afghanistan's climatic parameters. A number of destructive phenomena have formed in the country, particularly in the last two decades (Angiulli et al., 2020; Rezayanqihbashi, et al., 2016). Changes in the climate and the associated effects, such as changes in temperature and precipitation, rising sea levels, more extreme weather changes, and more hazardous conditions, are currently present in the world. Occurring risks caused by weather affect millions of people around the world every year (UNISDR, 2015). Weather behavior shows a noticeable change in the environment. This change is a phenomenon that occurs frequently (Esmailnejad 2022). A comprehensive approach to improve people's lives to achieve economic well-being. Social and environmental human settlements are called sustainable development. In other words, sustainable development is a process that organizes and regulates the relationship between humans and the environment. It manages the exploitation of resources and the environment, achieving increased and continuous production, secure living, food security, justice and stability. Facilitates the socialization and participation of people. Thus, protection and maintenance of reserves with a welfare approach sustained effectiveness of change processes for the present and future generations in order to make optimal use of capital reserves can be the central core of sustainable development

(Bourdages, 1997). World Commission on Environment and Development in 1987 for the first time the term sustainable development defined as development that meets the needs of the current generation without harming the ability of future generations the future provides in fulfilling its needs. Sustainable development has three economic, social and environmental dimensions. Therefore, stable temporal development must have three features: economically feasible, politically acceptable and environmentally friendly. Because every activity that humans perform is often motivated by profit and income. It is a process that occurs in nature using natural and (natural) resources. As the objectives of 2020, climate action and sustainable development are relevant to all areas of the program. At least 35% of Horizon 2020's total budget is expected to address climate action, while at least 60% involves sustainable development (European Commission, 2022).

Afghanistan faces warming rates higher than the global average. This is due to a potential rise of 1.4°C–5.4°C in the 2080s and 2090s, compared with 1986-2005. The range of possible temperature rises. Comprehensive understanding of current and future climate risks across multiple sectors is severely constrained by lack of data and research. This is an obstacle to adaptation and disaster risk reduction in Afghanistan (FAO, 2021). Highlights the significant differences between 21st century emissions pathways. In the theoretical explanation of the concept of sustainable development based on the interaction of the three dimensions of economic, social and environmental development, it is stressed the importance of balancing the three dimensions. Conservation, environmentalism and socialism have become dominant in economic development. The ultimate goal of sustainable economic growth is to maximize the benefits of expanding

the market and minimizing costs. In environmental development, providing resource carrying capacity. Protection and recycling of resources, reduction of waste and satisfaction of needs and self-increase in social development, reliance and empowerment can be achieved (Shaker, 2015; Hulme, M. 2016). Environmental threats have challenged human society since the last decades of the twentieth century by crossing the borders of the states. This has putting the foundation of human societies at risk. The biggest environmental threat today is global warming and climate change. Changing the climate program leads to water and food shortages, disease, unemployment and migration, poverty, tensions regarding resources and instability. It becomes global. Sustainable development is based on economic development, social progress and responsibility to guide human society towards a healthy, livable and sustainable world. In this sense, the central core of sustainability is based on maintaining capital reserves and, in fact, the concept of development is not human, social, natural or economic (the "capital reserves" document is nothing but sustainable). Therefore, the problem of the present research is that according to the existence of space uncertainty about the state of sustainable development and environmental changes and global warming (climate changes), what scenarios can be drawn for climate changes and the future of Afghanistan's sustainable development in the point of view in 2050.

Materials and Methods

Afghanistan is a mountainous and very dry country located in the dry sub-tropics at 9-37° north of the equator. Afghanistan has an arid and semi-arid continental climate with cold winters and hot summers. The lowland plains in Afghanistan experience extreme seasonal variations in temperature, with an average summer. Afghanistan

is currently suffering the most severe drought in living memory. The country is characterized by large areas with little to no precipitation; that which does occur falls mostly as snow on high mountains from winter storms (of Mediterranean origin) between November and April with peaks in February/March. Snow season varies considerably with elevation. The Asian summer monsoon system keeps rainfall low over Afghanistan. Dust storms are a significant part of the climate system associated with northerly winds in warm months (Savage et al., 2022). Afghanistan has an area of 652,860 km², and its population is about 40.5 million people, ranking 37th in the world. Afghanistan is the border between Central Asia and Southwest Asia, centered in Kabul. Afghanistan's neighbors are Pakistan in the south and east, Iran in the west, Tajikistan and Uzbekistan and Turkmenistan in the north, and China in the northeast (figure 1). Afghanistan is known as a country with a traditional agricultural economy and a low to moderate level of knowledge (general and specialized literacy), and a distance from modern industrial life. A country with three distinct regions is geographically divided into northern plains, primarily agricultural. The southwest plateau, mostly desert and semi-arid landscape, and the central highlands, including the Hindu Kush mountain range. Afghanistan has a dry climate, hot summers and cold winters. Winters in Afghanistan's central and northeastern highlands are very cold and harsh. So that the average temperature in January is below -15 degrees Celsius. On the other hand, the low-altitude areas of the southwest (Sistan basin), Jalalabad region in the east and Turkestan plains by the Amu Darya river in the north have hot summers and their average temperature in July reaches more than 35 degrees (Aich et al., 2017).

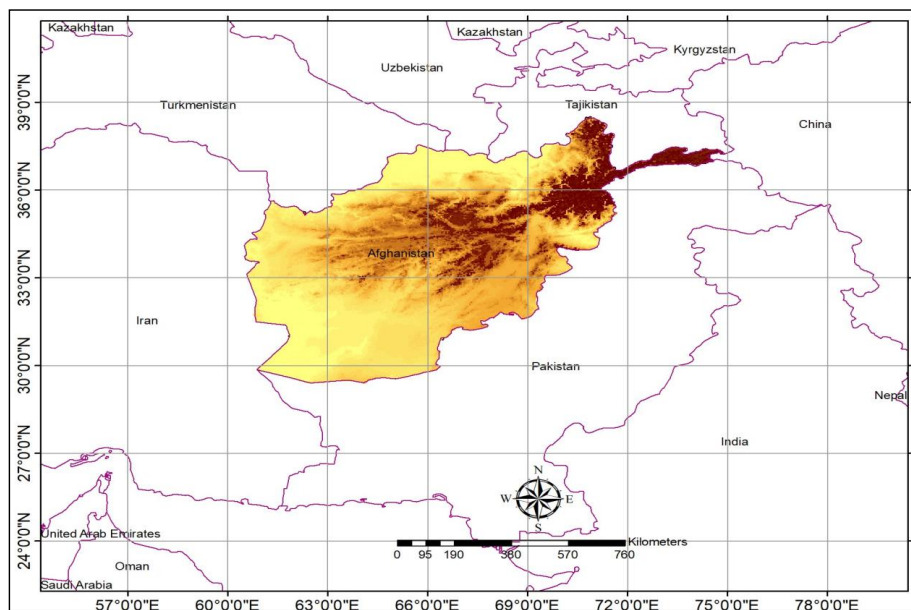


Figure 1. The location of the study area

Different methods and mechanisms can be used to identify possible and probable consequences of an issue. Scenario planning is one of the most widely employed methods in discovering future consequences. The present research assumes the four scenarios of global climate change in 2050 presented by the Center for Collaborative Research (JRC). The European Commission's Science and Knowledge Service is being developed in 2021. In this report, the report describes emerging trends and issues, following how they have evolved over time and investigate the opportunities and risks arising from it (figure 2). The results presented in this report are through the process forecasting and analyzing existing strengths and weaknesses as well as challenges and opportunities were done by experts from all over Europe and with the help of relevant commissions. Analysis in five areas: It is geopolitics, technology, economy, environment and society and four scenarios have been developed by examining the general trends affecting the development process and general global scenarios in the environment, which is the

hypothesis of this research, and seeing the drivers influencing climate change and sustainable development, climate change scenarios and the future of Afghanistan's sustainable development in the horizon of 2040 are written. The research approach is qualitative.

Results and Discussion

Climate change and variability are major concerns in the past decades, especially when integrated into economic development and human livelihoods (IPCC, 2018). Precipitation regimes vary more between regions than between temperatures. Mean rainfall over Afghanistan has decreased slightly (at an average rate of 0.5 mm per month (or 2 percent per decade) since 1960. This is mainly due to decreases of around 2.7 mm per month (6.6 percent per decade) in spring (MAM) rainfall. The proportion of rainfall in heavy events has not changed since 1960.

Current models indicate significant warming across all regions of Afghanistan with average predicted temperature increases of between 2 °C and 6.2 °C by

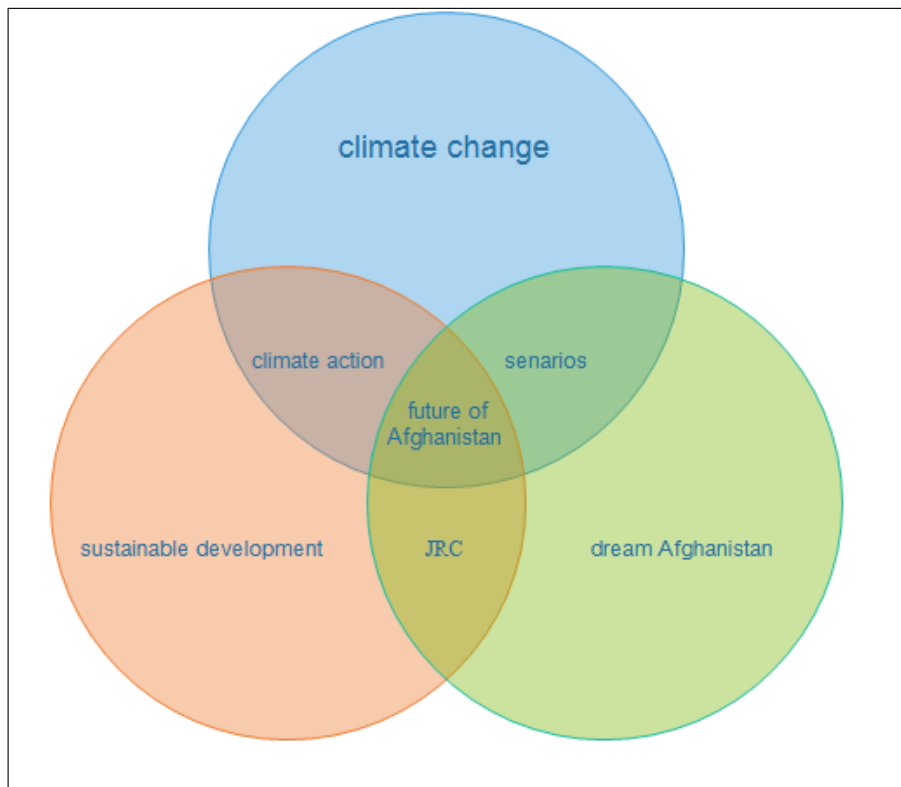


Figure 2. The future of Afghanistan sustainable development and climate action concept

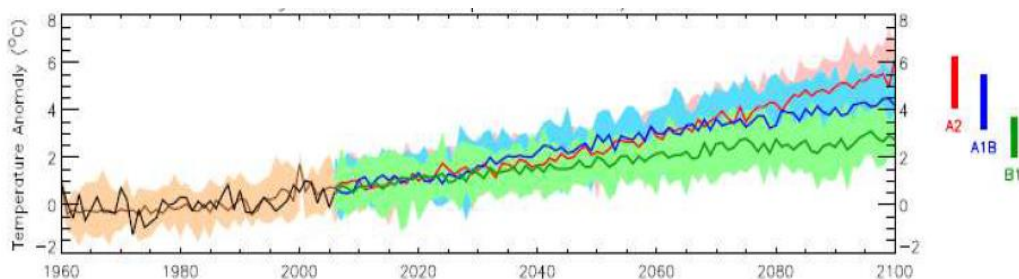


Figure 3. Change in temperature to 2100 under 3 emissions scenarios (vs. 1970-99 average) (source: Savage et al., 2014)

the 2090s dependent on global emissions scenarios. Warming is most rapid in spring/summer with this trend marked in the north and central plains of Afghanistan. These increases are also consistent with the broad regional temperature trends observed in Central Asia. All projections indicate substantial increases in the frequency of days and nights considered 'hot' in the current climate, especially during the summer months. Table (1) provides information on temperature projections

and anomalies for the four RCPs over two distinct time horizons; presented against the reference period of 1986–2005.

Afghanistan temperatures are expected to increase more than the global average. Under a high greenhouse gas emissions scenario (RCP8.5), maximum warming could reach about 2.3 °C by 2050, and up to 6.5 °C by 2100. Under a lower emissions scenario (RCP4.5), warming is predicted to reach 1.7 °C by 2050 and plateau around 2 °C by 2100. For both

scenarios, warming is expected to occur fairly uniformly throughout the year. However, it will vary geographically with the most severe warming occurring in the

mountainous Central Highlands and Hindu Kush areas.

Sustainable development involves the

Table 1. Anomaly for maximum, and average daily temperatures in Afghanistan for 2040–2059 and 2080–2099, from the reference period of 1986–2005 for RCP

Scenario	Average Daily Maximum Temperatures		Average Daily Temperatures	
	2040–2059	2080–2099	2040–2059	2080–2099
RCP2.6	1.5 (-0.1, 3.4)	1.5 (-0.3, 3.4)	1.5 (0.0, 3.1)	1.4 (-0.1, 3.1)
RCP4.5	2.1 (0.4, 3.9)	2.9 (1.7, 4.9)	2.0 (0.4, 3.6)	2.7 (1.0, 4.5)
RCP8.5	2.7 (0.9, 4.6)	5.8 (3.8, 8.1)	2.6 (1.1, 4.3)	5.5 (3.8, 7.5)

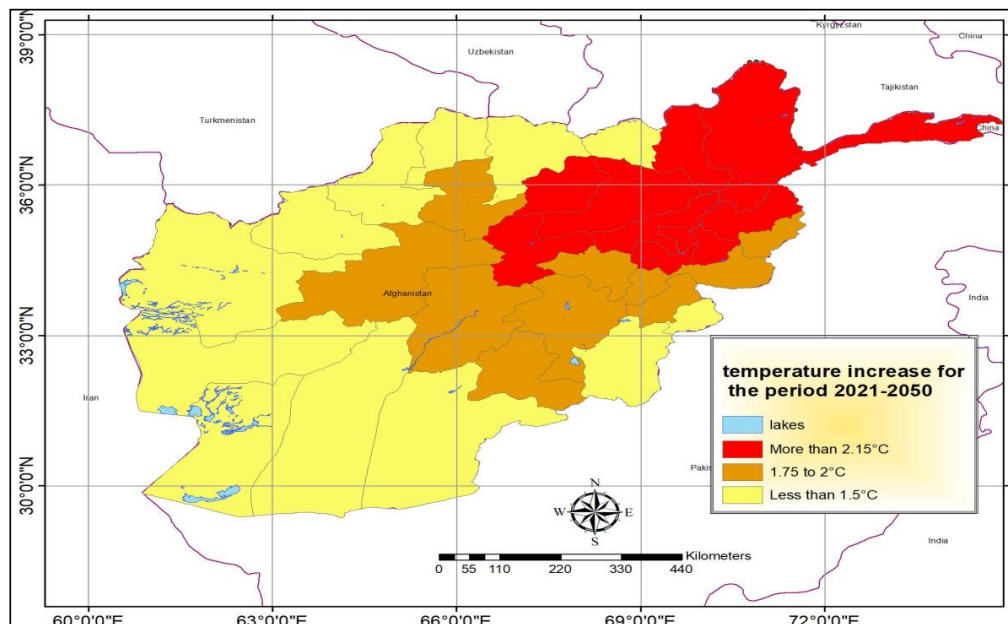


Figure 4. Temperature increase for the period 2021-2050

incorporation of socio-economic concerns and environmental protection into the economic decision-making process, in such a way that any developmental effort eventually favors immediate and future generations (Lawal et al., 2023). The initial identification of the engines mentioned at the beginning of reviewing the documents and checking the background of the obtained research. The experts added the items to the initial list as follows:

- Positive climate change and carbon emissions removal

- Greenhouse gas emissions have reached their lowest level.

- Renewable energy use has greatly increased.

- Reducing injustice, tension and social conflicts

- The world community basically provides a better life for most people through economic development.

- Will avoid the “collapse caused by nature” of humanity

- With water management, the world’s population will escape water stress.

- To eliminate poverty and inequality and reduce hunger.
- Production of healthy food
- Global GDP continues to grow through the second half of the 21st century, but at a slower rate decreasing.
- The temperature at the earth's surface is decreasing and the water level of the seas is still constant.
- The global health level has increased.
- Reducing and eliminating conflicts between and within countries and creating free trade in the world.

First scenario: ideal condition of Afghanistan

Seeing the blue sky without smoke and carbon dioxide is no longer a wish. Today, thanks to the use of renewable and green fuels in industry, production and cars, the sky of all Afghanistan cities is blue. In the last decade (2030-2050) all industrialized countries, including Afghanistan, have fulfilled their environmental commitments and Global warming and climate change have persisted, and the world has experienced a decrease in relative air temperature in recent years accompanied by and there is no news of the intense heat of the past two decades. The existence of smart technologies and modern and renewable energy along with constructive international relations and free commercial trade, has made the country's economic cycle flourish. People's lives are now prosperous and secure, stability and peace prevail.

Second scenario: Afghanistan on the way to stability

In addition to resuming the boom in renewable fuel production and use industries and machinery. Reducing greenhouse gases and creating more and more green industries to reduce unemployment and poverty and establish stability and social justice has resulted in today's society. The existence of

international and commercial connections and free trade with the region's countries creates a relatively strong economy in the region. Good competitiveness between the country and the industrialized countries of the world is being done from the holding of biological meetings in 2035, all compatriots are obliged to implement the plans that have become environmental in the country, and to some extent industries are also using renewable energy have brought and now despite the damage that has been done to all regions of the country in the last three decades had been, it has been prevented, although in the past decades, food security and drying areas. It covered the center of Afghanistan but now we have reached stability and security. In general, the people have relatively high economic and social well-being, and long-term sustainable development plans in the country run the Community Verified icon.

Third scenario: unstable Afghanistan

Instant wealth has become a priority over long-term prosperity for economic development in the country. Unfortunately, the environment is ignored without deep changes to consumption and production patterns to support generations the future will not be possible, and the ecosystem is falling apart. More than ever instant and momentary torrential rains (less annual rainfall) have turned Afghanistan into a desert. Crisis Water is intensifying in different regions of the country, food security has decreased greatly A severe class divide is forming in the country, despite economic growth and we have enjoyed good industrial production, a large percentage of the country has severe drought crises. Extreme droughts have been faced and this has caused the migration of people from hot and dry provinces. It has been to the northern areas. As Afghanistan has established free trade with other countries, excessive use of natural resources and mines will lead to

economic instability and poor economic growth.

Tensions between Afghanistan and neighboring countries over resources are on the rise. Economic growth is caused by unregulated markets and industries. Small and large companies that seek ambition and strategic independence do so. Due to the increase in air temperature and extreme climate changes in the last few decades, most of the agricultural land is unsuitable for farming. The country's agricultural land, food security, has faced a serious threat and artificial food production has become popular in Afghanistan. There are many programs and skills training in private companies. It is offered to help meet the current job needs and the workforce is currently in a state of resilience, and also vulnerability. At present, economic development is more of a topic. Environment is considered. Also in general, Afghanistan is experiencing an unstable development process.

Fourth scenario: Afghanistan in difficult conditions

The country is facing a serious threat of food shortages and lack of safe drinking water. In addition, certain diseases have spread in some areas due to climate change. Politicians prioritize the elderly and retired community. Despite modern technologies and clean and renewable energies, still industries and transportation Cargo and passengers in Afghanistan rely on fossil fuels. Objectives of environmental agreements have not been achieved and there has been a sharp increase in climatic events, including severe droughts and floods. Seasonal and uncultivated agricultural lands exist in all regions of the country. By becoming the central regions of the country live in the desert and in addition of severe pollutants in the air and water in that region.

Currently, there is a strong class conflict in society and there is a lot of migration

from most of the country's provinces towards the northern regions, which has also led to an increase in marginalization and many crimes. Despite constructive international relations and free trade between Afghanistan and other countries of the world, a stable economy does not exist in Afghanistan, and the wave of unemployment in the country is increasing. In general, it can be said that sustainable development of the social and environmental dimensions has not been formed. Ministries need to improve climate awareness and resilience. This will require risk screening within individual sectors. Improved coordination between Ministries will also be required to meet climate change cross-sectoral challenges, especially in terms of linkages between water, agriculture and livelihoods. This should be done through the development of a strategic plan that identifies and targets major agricultural, water, protection and rehabilitation projects both ongoing and planned. It places them within a high level adaptation strategy (table 2).

Conclusion

Afghanistan is already prone to climate change and its impacts that affect lives, livelihoods, homes, and infrastructure. These existing threats, coupled with Afghanistan's high dependence on agricultural livelihoods, its fragile ecosystem, poor socio-economic development and the impacts of over four decades of war, lay the foundation for extreme climate vulnerability. Droughts in many parts of the country are likely to become the norm, and episodic heavy precipitation will only result in flash floods and landslides. The consequences will be severe for Afghan lives, economic development, food insecurity, and migration. The biggest environmental threat today is global warming and climate change. Climate change leads to lack of water and food, disease, unemployment

Table 2. Climate change and issues of environmental sustainability strategic in Afghanistan

Priority Areas	Interventions
Protecting, restoring, and promoting the sustainable use of the environment	1. Protect, restore and support management of natural resources
	2. Strengthen resilience to climate change and natural hazards through
	3. Improve watershed management and precipitation infiltration and recharge as well as flood
	4. mitigation
	5. Reduce impacts of soil erosion and landslides by restoring original forestry and rangeland
	6. vegetation around watersheds
	7. Prepare and implement natural resource management plans for watersheds and/or restoration
	8. and protection of rangeland sites
Strengthening resilience to climate change and natural hazards	1. Support design enhancements for construction standards and technology for climate-proofed
	2. infrastructure for transport, energy and infrastructure sectors
	3. Improve infrastructure for hazard-prone and flood risk areas
	4. Improve irrigation systems to protect against flooding and improve drought mitigation measures
	5. Develop capacities for disaster-resilient design, risk-sensitive land use planning, and disaster
	6. risk management

and migration, poverty, tensions regarding resources and instability in Afghanistan is global. Due to the fact that climate change is a global and creeping phenomenon, and the fact that its effects are not tangible due to its gradual nature, we will have problems in the long run if there is no action taken to deal with its effects. Climate change is not solved as a problem, but as a fundamental for advancing political and social projects on the planet. Effects of water changes and air pollution are currently causing instability in vulnerable areas including Afghanistan and the world. The planet is facing extreme weather threats including long droughts, fires Unprecedented, sea level rise and polar ice melting will cause huge floods and severe water shortages. Since Afghanistan is located on the land belt of the world, these threats to the country are more severe than they will be. Including the problem of domestic and international water tensions, land becoming uncultivable for agriculture, threatening food security, creating poverty and unemployment and severe class conflict in different regions of the country, destructive internal and international immigration and the creation of marginalization in receiving cities, the prevalence of delinquency, etc. In order

to achieve sustainable development in Afghanistan, we must take into account the major trends and drivers sustainable development and climate change through economic development, social progress and environmental responsibility to guide the human society towards a better, livable and environmentally friendly world. In this sense, the core and the central concept of sustainability is based on maintaining capital reserves and, in fact, sustainable development like human capital, it is not social, natural and monetary, and the growth of a “capital stock” is anything but the dimension alone does not lead to sustainable development, especially if the environmental dimension and climate change are ignored and taken, despite the economic development, sustainable development will not happen and Afghanistan will become an impossible desert Biotransformation will occur. Afghanistan’s mean temperature has increased by 1.8 degrees Celsius since 1950, more than twice the global average. Rising temperatures have affected average precipitation leading to floods and landslides, as well as fluctuations in groundwater levels. While mainstreaming climate change in development planning

is critical, Afghanistan's adaptation challenges are very significant in scope and scale. External investment and technical support will be required if these challenges are to be met. Therefore begin to create costed adaptation investment planning scenarios as a first step towards applying potential climate adaptation funding mechanisms currently under development by the international community.

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