



Shifting the Paradigm – from Managing Drought Disaster to Managing Risk in Afghanistan (Author: A. Himat)

Climate Change Update Series on Afghanistan – Policy Papers and Discourse



Preface

The effects of climate change on meteorological parameters in nature intensify and increase natural phenomena, especially droughts. Afghanistan is affected by local droughts almost every year, which have a huge adverse impact on the lives of communities, particularly the population engaged in agriculture and livestock.

To increase the awareness of preventive measures and provide viable solutions to climate change-induced issues in Afghanistan, Onai has initiated the *Climate Change AFG-Update – Policy Papers & Webinars Series*. This series aims to provide a platform for research and advocacy on climate change-related matters in Afghanistan to provide viable and appropriate adaptation and mitigation solutions to the existing and future challenges.

We have started the mentioned series with the status of drought management in Afghanistan, also in the light of the current drought in the country. Due to a lack of a holistic perspective on drought management in the country, the vulnerability of communities to drought is increasing year by year. Therefore, drought mitigation strategies and their proper implementation are crucial for drought risk management to moderate the negative impacts of droughts in the country.

Onai would like to thank the author of this first paper, Mr. Abobaker Himat, who was ready to work on the important topic of drought management, which shall contribute to initiating a debate on drought managing in Afghanistan in the long term with the aim to facilitate a shift of paradigm – from disaster to risk management of drought.

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Shifting the Paradigm – *from Managing Drought Disaster to Managing Risk in Afghanistan*

Abstract

Afghanistan is a drought-prone country. Drought is a natural disaster that affects the agricultural sector of the country the most. Drought management comes in two forms: disaster and risk management. Having a drought management plan and implementing it are known as drought risk management.

In developed and developing countries, a drought risk management approach is used, which reduces the effects of drought. In less developed countries, the lack of drought mitigation plans makes people more vulnerable to drought. In Afghanistan, for drought management, a disaster management approach has been used for a long time which is not effective. Thus, the shifting of paradigm from drought disaster management to drought risk management is assessed in this paper. Furthermore, a brief review of the historical background of drought in the country, current drought-related policies and institutions, gaps in drought management, current drought effects on the country, and recommendations on how to facilitate the above-mentioned shift of paradigm are provided to stakeholders engaged in the relevant sectors.

Keywords: climate change; disaster management; drought management; drought risk management in Afghanistan

1 Introduction

Afghanistan has a dry continental climate, though the mountainous terrains divide the country into many local climatic regions. There are enormous variations in temperature and precipitation; temperatures vary from -10 °C in winter to 34 °C in summer, annually more than 50 percent of the country receives less than 300 mm of precipitation, of which 80 per cent occurs in winter and spring (January–June) as snow in the central mountainous regions (FAO, 2012).

As an optimistic scenario, climate change projections for Afghanistan show a temperature increase of around 1.4 °C until 2050 and for spring season precipitation a distinct decrease which will affect the rain-fed agriculture, furthermore; projections for precipitation all over the country show a decrease of around -20% until 2100 (NEPA/UNEP, 2016).

The economy of Afghanistan is dominated by agriculture, which accounts for more than 50% of the national gross domestic product (GDP) and employs around 66% of the country's workforce (FAO, 2015). More than 95% of the current water use in Afghanistan is accounted for by irrigation in agriculture (Qureshi, 2002). Moreover, around 50 to 75% of the cultivated area across the territory has experienced failure due to the drought conditions (WFP, 2004). There is a direct link between droughts phenomenon and water scarcity in Afghanistan, affecting agriculture and crop yields (Qureshi, 2002).

Drought is defined as the amount of deficit precipitation over a long period that causes an imbalance in the amount of water. There are four types of droughts, namely, meteorological, hydrological, agricultural, and socio-economic drought. These drought categorizations are time-dependent, starting



with meteorological and turning then into socio-economic drought over time. As a consequence of socio-economic drought, internal displacement and migration to neighbouring countries take place in the country, as we have experienced many times in Afghanistan during the recent decades.

In Afghanistan, severe drought generally means low winter precipitation in two successive years. October 2020 to February 2021 was the driest winter in 40 years in the central and western regions of Afghanistan, caused by the La Niña phenomenon, affecting the wheat season of 2021 (IRC, 2021).

Drought has a direct link to food security in Afghanistan. Most Afghans live in rural regions of the country, and their lives depend on agriculture (FAO, 2021a). The rural communities lose their agricultural and livestock productions during drought periods. According to Příkladová and Příkladová (2019), most of the displacements from rural to urban and neighbouring countries occur during the drought periods (Příkladová and Příkladová, 2019), due to food insecurity and devastating poverty within the communities.

According to the World Bank (2017) estimates, on average, droughts cause \$280 million/year economic damages to the agricultural sector in Afghanistan. The lack of drought mitigation plans in the country has increased the number of affected populations of drought. Akhtar (2017) suggested that long-term drought management should be seen as part of integrated water resources management strategies, as updated and reliable information on water resources can help facilitate better planning for drought management and mitigate the severe effects on the economic conditions of the population.

In this paper, the systematic approach of shifting the paradigm from managing drought disaster to managing risk in Afghanistan for drought mitigation policies is assessed. Furthermore, a brief review of the historical background of drought in the country, current drought-related policies and institutions, gaps in drought management, current drought effects on the country, and recommendations are provided to relevant stakeholders engaged in Afghanistan.

2 Historical Background of Droughts in the Country

In Afghanistan, extreme droughts generally occur due to a lack of winter precipitation for two consecutive years. Drought has occurred in almost all parts of the country in different years. Recently in Afghanistan, moderate, severe, and extreme droughts have occurred every 3–5, 10–15, and 20–25 years, respectively (NWARA, 2021). The last reported extreme and prolonged drought event was during the 1999–2002 period, while 2008 and 2018 were moderate and severe droughts, respectively. The last recorded droughts in the country are: 1898–1905, 1944–1945, 1963–1964, 1966–1967, 1970–1972, 1999–2002 (Favre and Kamal, 2004; CSO, 2014). Several drought events were also observed from 2002 to 2011 that severely affected the agriculture and livestock sector in rural areas of the country (Rafferty, 2011).

Due to climate change, more frequent and severe droughts in the future are expected (Qutbudin et al., 2019). Gaps in drought mitigation strategies are among the prohibitive elements of proper drought management in the country and therefore require particular attention.

3 Gaps in Drought Mitigation Strategies in Afghanistan

The Afghan government's drought mitigation policies and practices at present are at the embryonic stage (Bhattacharyya et al., 2004). In the country, rather than risk management there is a disaster management perspective. Thus, to change the situation from disaster management to risk



management there is a need for an Afghan National Drought Policy Framework. Nowadays, locally managed water harvesting based on historical systems is the most suitable option for mitigating drought in arid and semi-arid regions of the world (Bhattacharya et al., 2004). In Afghanistan, ancient water harvesting systems like *Karez* and *Cha* (a well) are about to become extinct (Hussain et al., 2008); for the rehabilitation of such drought mitigation measures, little work has been done in Afghanistan (Bhattacharya et al., 2004).

Due to war, lack of financial and technical support, and a rapid population increase in the past decades, minimal effort has been shown for drought mitigation in Afghanistan.

There is a need for financial and technical support from national disaster management agencies to implement the drought risk management strategies (Siddiqi and Peters, 2019). In 2010, the first National Platform for Disaster Risk Reduction in Afghanistan was launched, but it was not implemented due to the lack of financial support (Komino, 2014).

The lack of coordination between the central and local government tiers for implementing drought-related strategies is one of the challenges that Afghanistan has faced in the last decades. At the local levels, governance in Afghanistan still faces multifold challenges, such as the lack of capacity to develop plans and budgets, as their resources and capacity are low and insufficient to meet the needs of the society (Habib, 2013).

Limited data availability, financial and human resources hinder the efforts on disaster risk management to plan, prioritize, and implement, based on actual risk information in Afghanistan (UNDRR, 2020).

A list of main drought risk management challenges is provided below (Khalid, 2018):

- The absence of budget allocation in the national budget for drought risk management;
- Limited institutional capacity;
- Lack of technical expertise and resources;
- Lack of an early warning system;
- Lack of investment in drought risk management and resilience-building;
- Limited usage of advanced technologies;
- Lack of coordination; and
- Corruption.

There is a lack of integrated and implementable policies, as the current policies exist on paper, but their knowledge and practical value are limited at the execution level (Ahmadzai et al., 2017). Furthermore, the lack of coordination between policymakers and locals has reduced the realization of these policies.

Aside from the aforementioned gaps in the mentioned mitigation strategies, the existing institutions and their performance face shortcomings, which is considered an additional impediment to effective drought management in Afghanistan.



4 Current Situation – Institutions, Policies, and Management of Drought in Afghanistan

4.1 The current drought and its effects on Afghanistan

The drought of 2021 in the country threatens the livelihoods of more than 7 million people who rely on agriculture and livestock. Many are already among the 14 million acutely food insecure people and need urgent humanitarian assistance (FAO, 2021a). Due to the acute drought in the country, the current wheat harvest is expected to be 20 per cent below that of 2020 and 15 per cent below average (FAO, 2021b).

According to the United Nations Development Programme (UNDP), Afghanistan’s poverty rate is currently 72%, and it is expected to be 97% by mid-2022 (UNDP, 2021), with the recent political collapse, the economic situation, and drought as the main drivers behind the extreme poverty in the country.

The Famine Early Warning Systems Network (FEWS NET) analysed acute food insecurity due to drought and conflict for two-time intervals: July–Sep. 2021 and Oct. 2021 – Jan. 2022. As indicated in Figure 1, half of the country is in a food security crisis, and humanitarian organizations expect an escalation to level four – Emergency – in the next few months if the required humanitarian support is not delivered on time.

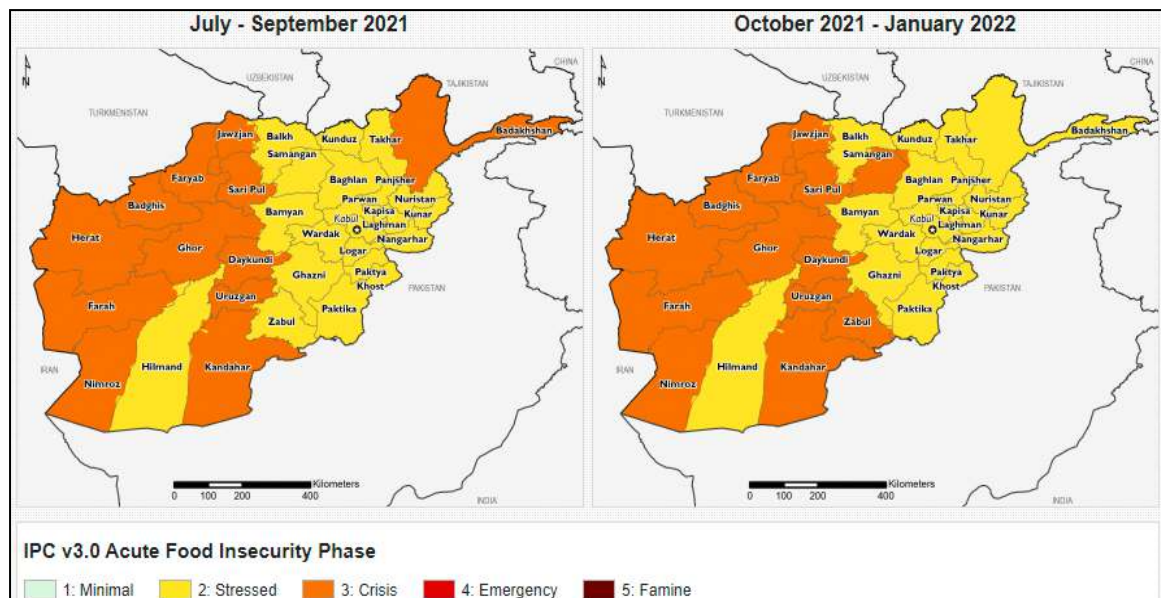


Figure 1: Second-season planting area likely below average due to atypically dry conditions and conflict in Afghanistan (FEWS NET, 2021).

According to the International Federation of Red Cross and Red Crescent Societies (IFRC), over 80% of the country is in a severe drought; urgent international action is needed to support more than 18 million people who will need humanitarian support in Afghanistan this year due to the drought and food crisis, compounding the impact of record COVID-19 cases and many years of armed conflict (IFRC, 2021). Furthermore, the IFRC (2021) stated that, in recent decades, the drought and food crisis is one of the worst suffered in Afghanistan, as 13 million people are grappling with food shortages, according to the latest food-security analysis.



Even though some institutions deal with disasters and draft policies on paper, the country's drought management is still more an emergency response than a well-thought and responsive approach to proactively managing droughts. Details of current institutions and policies' context are given in the following section.

4.2 Current Institutional and Policies Context on Drought in Afghanistan

The government of Afghanistan has been dealing with multiple drought events for a long time. During the last two decades, there have been multiple initiatives by the government and development partners at policy, institutional, and drought response, recovery, and mitigation levels (NEPA, 2015). A short review of the current policy, institutional and programmatic context related to drought in the country is provided below.

In 2019, as a result of joint efforts by the Food and Agriculture Organization (FAO) of the United Nations and the Ministry of Agriculture, Irrigation & Livestock (MAIL), the "Afghanistan Drought Risk Management Strategy (2019–2030)" was formulated (FAO, 2019).

Currently, three kinds of policy instruments exist that govern drought management actions in Afghanistan: (a) comprehensive government development policies and strategic frameworks; (b) the sector-specific instruments; and (c) the specific drought management instruments (FAO, 2019).

Drought has been mentioned in comprehensive national policies like the Afghanistan National Peace and Development Framework (ANPDF) of 2018, the Afghanistan National Development Strategy (ANDS) of 2009, and its related National Priority Programmes (NPPs).

A Drought Management Policy was drafted in 2008, while the National Drought Management Strategy and Policy was formulated in 2010/2011, but both are still not officially adopted; this resulted in mostly reactive management of droughts through humanitarian aid response.

There have been unifying efforts related to drought through the Law on Disaster Response, Management, and Preparedness, the Drought Management Strategy, and the Afghanistan Strategic National Action Plan (SNAP) for Disaster Risk Reduction.

Likewise, in the form of institutional arrangements, some efforts have been made, such as (i) the establishment of the High Commission on Disaster Management (HCDM) in 2013; (ii) the formation of the National Drought Management Committee (NDMC) in 2009; (iii) the creation of the Drought Technical Working Group in 2007–08 under the Supreme Council of Land Water and Environment (SCLWE) (UNICEF, 2016); (iv) the establishment of the Integrated Water Resources Management (IWRM) group in 2007; and (v) the formation of the Afghanistan National Disaster Management Authority (ANDMA), which was mandated with developing drought preparedness and emergency response plans.

Even though the National Council on Disaster Management (NCDM) is responsible for all Afghanistan's declarations, uncertainty exists. It is not clear whether ANDMA, the Ministry of Agriculture, Irrigation & Livestock (MAIL), the Ministry of Energy and Water (MEW), the Ministry of Rural Rehabilitation and Development (MRRD), or the Afghanistan Meteorological Department (AMD) is mandated to declare a drought disaster officially (FAO, 2019).

AMD has recently initiated an analysis of the drought index in Afghanistan. The National Statistics and Information Authority (NSIA) was mandated in 2018 through a Presidential Decree to constitute a National Early Warning Committee. ANDMA is mandated with developing drought preparedness and emergency response plans.



MAIL, MEW, and MRRD have implemented several programmes for drought management from an agricultural and water management perspective.

High-level governmental organizations with coordination should develop drought mitigation policies for drought risk management rather than disaster management.

In drought risk management, early warning (prediction) is one of the most critical components. In 2021, for drought, early warning, a draft concept note of Early Warning, Early Finance, and Early Action (ENETAWF) was drafted by the World Bank (World Bank, 2021). In Figure 2, proposed organizational structures for drought prediction, early warning, and food security are illustrated, developed by stakeholders of the ENETAWF project.

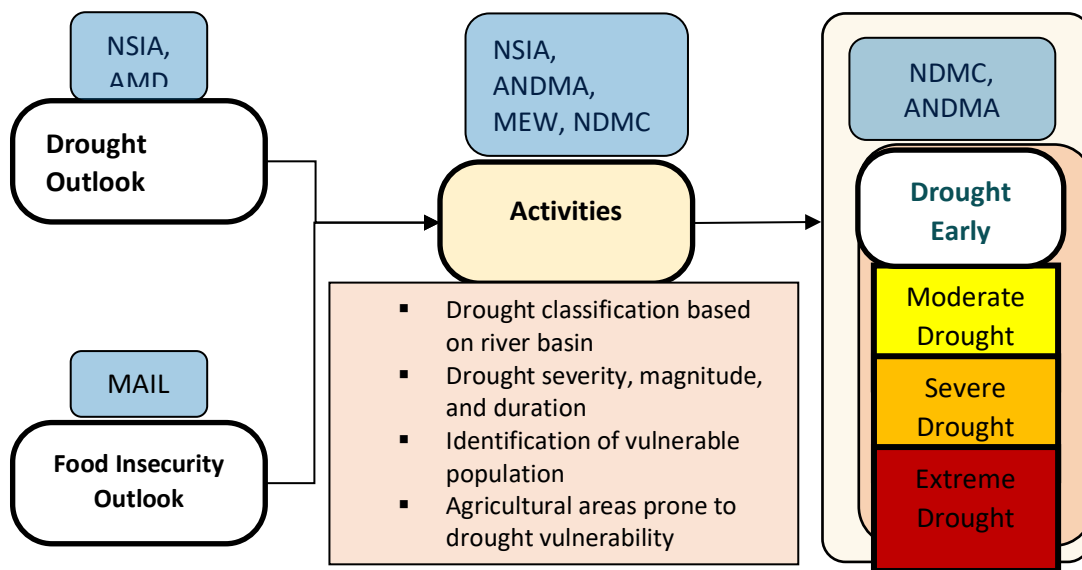


Figure 2: Proposed organisational structure for drought prediction, early warning, and food security adapted from World Bank (2021).

The current institutions and policies context on drought are not fulfilling the needs of drought management in the country, as most of them exist on paper but lack proper execution and management on a national and sub-national level. The current drought management in the country is the disaster management approach; in the following section, the drought risk management approach is proposed for the future of drought management in the country.



4.3 Current Situation and Future of Drought Management in Afghanistan

In Afghanistan, out of 6.5 million hectares (ha) of arable land, 3.4 million ha are rain-fed (FAO, 2010), and Northern Afghanistan has the highest share of rain-fed land in the country (Tiwari et al., 2020). The drought of 2021 hit the northern and western parts of the country, which has affected rain-fed agriculture the most (FEWS NET, 2021). Drought is time-dependent; thus, over time, it may affect irrigated agriculture as well. Therefore, the development of effective drought mitigation strategies is crucial to address on-farm water management and can be viewed as a fundamental pillar for the effective management of the country's water resources. Consequently, it requires a holistic and sustainable approach in order to mitigate the adverse effects of droughts on agriculture and livestock in the country that will undoubtedly increase with the following years and decades as a result of climate change.

Generally, there are two steps in effective drought management: (1) drought risk management; and (2) drought disaster management (Figure 3). These two mechanisms are complementary and must be in place in order to ensure effective drought management. However, if there is only drought disaster management in place, without the preventive risk management approach, the management of drought events is deemed ineffective. This paper illustrates the necessity for drought risk management within the framework and points out the shortages in case this pillar is not considered.

In Figure 3, the main drought management components are illustrated. Drought risk management components are prediction, mitigation, planning, and monitoring. Drought disaster management components are impact assessment, response, recovery, and reconstruction. Currently, similarly to other developing countries, there is a disaster management approach in place rather than risk management in Afghanistan. When drought strikes, governmental and non-governmental organizations respond with emergency assistance, which is insufficient and cannot cover the losses and damages to the people and the involved economic sectors.

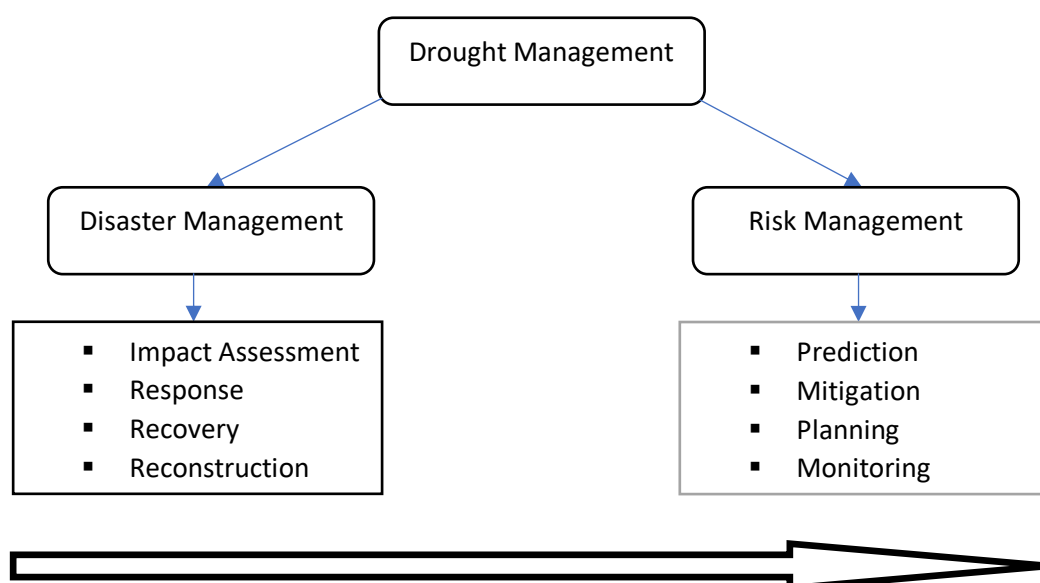


Figure 3: Drought management components adapter from Wilhite et al. (2014).



Based on the assumption that the cost of action (drought risk management) is usually lower than the cost of inaction (drought disaster management), by shifting the paradigm in drought management, the losses can be reduced significantly (Wilhite, 2017). For the future of drought management in the country, a conceptual model that illustrates the required shift of paradigm from managing drought disaster to managing risk in Afghanistan is shown in Figure 4. Some significant components of drought risk management are as listed below:

Prediction: based on analysis of drought indices, the characteristics of drought and affected areas in the country can be defined.

Mitigation: three types of drought mitigation plans should be considered: long-term, mid-term, and short-term, as recommended in section 6.

Planning: planning can be developed for various sectors such as: urban water systems; irrigation systems; water infrastructure; rural water supply; and rain-fed agriculture.

Monitoring: establishment of a national drought mitigation centre for monitoring drought in the country.

A drought risk management should include the following components:

- Drought forecasting and warning for drought management planning;
- Drought mitigation plans;
- Planning for drought preparedness;
- Drought monitoring;
- Study and evaluation of drought severity and duration over water resources and agriculture;
- Classification and magnitude of drought for the upcoming season;
- Assessing the severity of drought in different parts of the country;
- Economic assessment of drought;
- Social assessment of drought;
- Environmental assessment of drought.



Shifting the Paradigm from Managing Drought Disaster to Managing Risk in Afghanistan

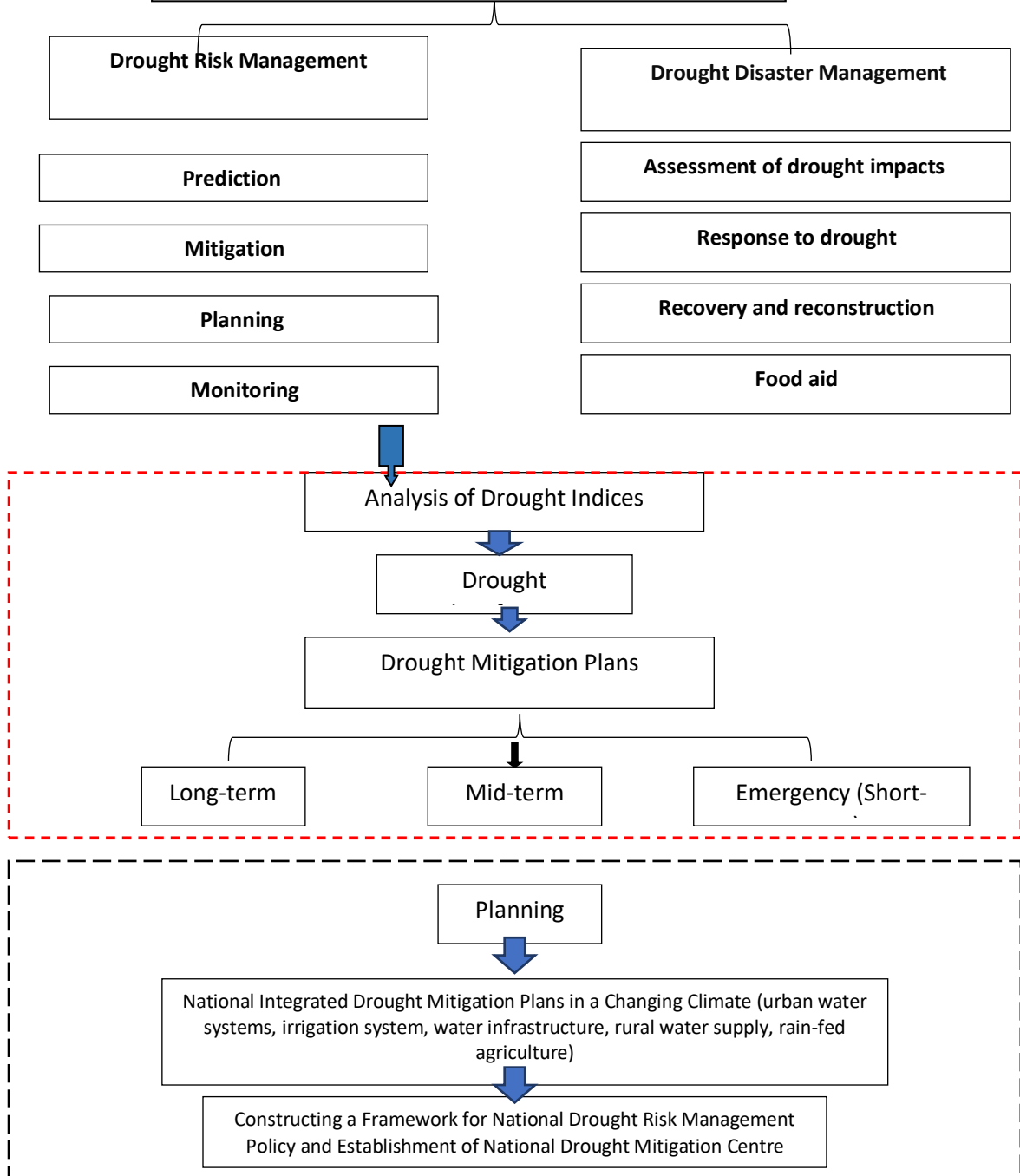


Figure 4: Conceptual model of shifting the paradigm from managing drought disaster to managing risk in Afghanistan.



5 Conclusion

Despite some efforts by the government and international partners, practical steps in terms of a holistic approach for drought risk management in Afghanistan are still not visible. The main reasons for the existing dilemma are, aside from the limited capacity of institutions, the lack of awareness and knowledge on the necessity to implement a drought risk management approach in the country. Moreover, the shortage of financial means to establish institutions which long-term planning and execution tools is another impediment to drought management in Afghanistan.

In Afghanistan, the existing policies promote a disaster management approach primarily whenever a disaster occurs. Therefore, a policy shift from disaster management to risk management is crucial, as it paves the way for establishing a sustainable approach based on prevention rather than a response to disasters.

In order to minimize human and development losses due to droughts, there is a need to follow a holistic approach involving drought mitigation, preparedness, response, and recovery. These include: risk management and vulnerability reduction; promoting public awareness; social protection; knowledge sharing; capacity development; emergency response coordination; and sustainable recovery.

Based on the assumption that the costs of action are usually lower than the costs of inaction, the losses can be reduced significantly by shifting the paradigm in drought management.

Reviewing and analysing historical water harvesting and disaster management systems, which were common in the past, should also be considered while considering the mentioned shift. Here, the review shall not be limited to Afghanistan, but best practices from the past and present in other regional countries shall be contemplated and incorporated into the framework.

As the most affected sector is agriculture, on-farm water management projects can be implemented for drought mitigation. Implementation of such projects might be part of a solution to make the communities drought-resilient.

6 Recommendations

To draft a practical and implementable drought mitigation plan, it is recommended to consider the following aspects divided into short-term, mid-term, and long-term recommendations:

Short-term recommendations;

- The most drought-prone regions and the most vulnerable economic sectors of the country have to be identified;
- The decision-makers and the public should be informed of current drought conditions;
- Provision of food for vulnerable communities and shelter for displaced families;
- Provision of training to protect health and safety;
- Provision of livelihoods assistance;

Mid-term recommendations;

- Participation of media in raising awareness for water-saving;
- Strengthen and establish an early warning system for drought;
- Drought-related information should be collected and analysed in a timely and systematic manner;



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- Implementation of a rainwater harvesting programme;
- Coordinated actions between stakeholders to reduce the effects of coming droughts.

Long-term recommendations;

- A national drought mitigation centre should be established for drought risk management;
- Strengthen watershed management by constructing small and medium reserve dams for diversion and water management in the country;
- Substitution of cultivation and irrigation (drought-tolerant plants);
- Some successful experiences related to drought mitigation strategies from neighbouring countries should be implemented;
- Water reuse can be used for drought mitigation and adaptation;
- Implementation of artificial recharge of groundwater for drought mitigation can be used in the country's most affected areas.



7 References

- Akhtar, F., (2017). Water availability and demand analysis in the Kabul River Basin, Afghanistan. Ph.D. Dissertation, *University of Bonn*, Germany.
- Ahmadzai, A., Azizi, M. A. and Behzad, K. (2017). The impacts of water sector reforms on agricultural productivity in Afghanistan. *Afghanistan Research and Evaluation Unit (AREU)*.
- Bhattacharyya, K., Azizi, P. M., Shobair, S. S. And Mohsini, M. Y, (2004). Drought impacts and potential for their mitigation in southern and western Afghanistan. Working Paper 91. *International Water Management Institute*. Colombo, Sri Lanka.
- CSO, (2014). National Risk and Vulnerability Assessment 2011-12: Afghanistan Living Condition Survey. *Central Statistic Organization*. Kabul, Afghanistan.
- FAO (2010). The Islamic Republic of Afghanistan land cover atlas. *Food and Agriculture Organization of the United Nations*.
- FAO, (2012). Country profile–Afghanistan, FAO AQUASTAT Report. *Food and Agriculture Organization of the United Nations*. PP.6
- FAO, (2015), Rehabilitating irrigation in Afghanistan. What we do: Focus on Afghanistan, <http://www.fao.org/nr/water/news/afghanistan.html> (Accessed on: 27- Sep 2021).
- FAO, (2019). Afghanistan Drought Risk Management Strategy: 2019-2030, *Food and Agriculture Organization of the United Nations*. pp.99.
- FAO, (2021a), Afghanistan: FAO appeals for \$36 million to urgently save rural livelihoods and avoid massive displacement, <http://www.fao.org/news/story/en/item/1438899/icode/> (Accessed on: 24-Sep 2021).
- FAO, (2021b). Drought threatens the livelihoods of 7 million farmers in Afghanistan. The Food and Agriculture Organization of the United Nations. <http://www.fao.org/news/story/en/item/1436950/icode/> (Accessed on: 19-Sep-2021).
- Favre, A. and Kamal, G. M., (2004). Watershed Atlas of Afghanistan. Kabul: Government of Afghanistan, Ministry of Irrigation. Water Resources and Environment. *Food and Agricultural Organization of the United Nations*.
- FEWS NET, (2021). Second-season planting area is likely below average due to atypically dry conditions and conflict. <https://fews.net/central-asia/afghanistan/key-message-update/july-2021> (Accessed on: 12-Sep-2021).
- Habib, S. (2013). Local Government in Afghanistan: How it works and main challenges. *21th Nispacee annual conference*, 21(1), 1-16.
- Hussain, I., Abu-Rizaiza, O. S., Habib, M. A. and Ashfaq, M. (2008). Revitalizing a traditional dryland water supply system: the karezes in Afghanistan, Iran, Pakistan, and the Kingdom of Saudi Arabia. *Water International*, 33(3), 333-349.
- IFRC, (2021). Afghanistan: Over 80% of the country is in a serious drought. <https://www.ifrc.org/press-release/afghanistan-over-80-country-serious-drought> (Accessed on: 10-Sep-2021).
- IRC, (2021). Drought assessment report, *International Rescue Committee*, pp. 4.
- Khalid, A. M. (2018). Disaster risk management in Afghanistan: exploring the possible implications of climate change, MSc Thesis, *Central European University*, Budapest, Hungary.
- Komino, T. (2014). Disaster risk reduction national platform and strategic national action plan in Afghanistan. In *Civil Society Organization and Disaster Risk Reduction* (pp. 29-41). Springer, Tokyo.
- NEPA, (2015). Afghanistan Climate Change Strategy and Action Plan, *National Environmental Protection Agency*, Kabul, Afghanistan.
- NEPA and UNEP, (2016), Afghanistan: Climate Change Science Perspectives. Kabul: *National Environmental Protection Agency and United Nations Environment Programme*, pp.5.
- NWARA, (2021). Report of Drought Periods Analysis, the Situation of the 2020/2021 Water Year and Its Effects on Water Resources in Five Major River Basins, *National Water Affairs Regulation Authority*, Kabul, Afghanistan.



Afghanistan Climate Change Update Series

- Přivara, A. and Přivarová, M. (2019). Nexus between climate change, displacement and conflict: Afghanistan case. *Sustainability*, 11(20), 5586.
- Qureshi, A. S., (2002). Water resources management in Afghanistan: The issues and options, *International Water Management Institute, vol. 49*.
- Qutbudin, I., Shiru, M. S., Sharafati, A., Ahmed, K., Al-Ansari, N., Yaseen, Z. M., ... and Wang, X. (2019). Seasonal drought pattern changes due to climate variability: Case study in Afghanistan. *Water*, 11(5), 1096.
- Rafferty, D., (2011). Afghanistan Drought. Millions in Need of Support to Meet Immediate Needs and Rebuild Livelihoods, <http://www.actionaid.org/2011/09/afghanistan-drought> (Accessed on: 25-Sep 2021).
- Siddiqi, A. and Peters, K. (2019). Disaster risk reduction in contexts of fragility and armed conflict: a review of emerging evidence challenges assumptions. *Input paper for the Global Assessment Report*.
- Tiwari, V., Matin, M. A., Qamer, F. M., Ellenburg, W. L., Bajracharya, B., Vadrevu, K., ... and Yusafi, W. (2020). Wheat area mapping in Afghanistan based on optical and SAR Time-series images in google earth engine cloud environment. *Frontiers in Environmental Science*. 8, 77.
- UNDP, (2021). 97 percent of Afghans could plunge into poverty by mid-2022, says UNDP. <https://www.undp.org/press-releases/97-percent-afghans-could-plunge-poverty-mid-2022-says-undp> (Accessed on: 15-Sep-2021).
- UNDRR, (2020). Disaster Risk Reduction in Afghanistan: Status Report 2020. *The United Nations Office for Disaster Risk Reduction and The Asian Disaster Preparedness Center*.
- UNICEF, (2016). Country-Specific Background Paper on Drought: Afghanistan, *Regional Office for South Asia*. Kathmandu.
- Wilhite, D. A., Sivakumar, M. V. and Pulwarty, R. (2014). Managing drought risk in a changing climate: The role of national drought policy. *Weather and Climate Extremes*, 3, 4-13.
- Wilhite, D. A. (2017). Drought management and policy: Changing the paradigm from crisis to risk management. *European Water*, 16, 181-187.
- World Bank, (2017). Disaster Risk Profile Afghanistan. *The World Bank*. Washington D.C.
- World Bank, (2021). Early Warning, Early Finance, and Early Action (ENETAWF) project. <https://projects.worldbank.org/en/projects-operations/project-detail/P173387> (Accessed on: 02-Oct 2021).
- WFP, (2004). Afghan food production hit by drought and pests: poor face rising food prices. <https://www.wfp.org/news/news-release/afghan-food-production-hit-drought-and-pests-poor-face-rising-food-prices> (Accessed on: 23-Sep 2021).