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Preliminary Analysis of the National Drought Plans

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Document Version

Publisher's PDF, also known as Version of record

Publication date:

2022

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Tsegai, D., Adaawen, S., & Girault, F. (2022). *Preliminary Analysis of the National Drought Plans*. United Nations Convention to Combat Desertification (UNCCD). <https://www.unccd.int/sites/default/files/relevant-links/2022-01/Analysis%20of%20National%20Drought%20Plans.pdf>

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Preliminary Analysis of the National Drought Plans

Daniel Tsegai, Stephen Adaawen & Felix Girault



United Nations
Convention to Combat
Desertification

Bonn, 2021

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LIST OF ACRONYMS

CEE	Central and Eastern Europe
COP	Conference of Parties
DRAMP	Drought Resilience, Adaptation and Management Policy
GWP	Global Water Partnership
HMNDP	High-Level Meeting on drought Policy
IDMP	Integrated Drought Management Programme
IPCC	Intergovernmental Panel on Climate Change
LAC	Latin America and Caribbean
NDP	National Drought Plan
UNCCD	United Nations Convention to Combat Desertification
WMO	World Meteorological Organisation
COP	Conference of Parties
DRAMP	Drought Resilience, Adaptation and Management Policy
GWP	Global Water Partnership
HMNDP	High-Level Meeting on drought Policy
IDMP	Integrated Drought Management Programme

ACKNOWLEDGEMENTS

The authors would like to thank Ms. Louise Baker (Head of ERPA, UNCCD) for supporting the endeavour to analyse the national drought plans and for making the time to read and offer suggestions towards the completion of this analytical piece. Much appreciation also goes to the GM team (Hansol Park, Camilla Nordheim-Larsen, and Aasha Subedi) for making the information on the national droughts plans available for analysis. A big thank you also goes to Erkan Guler for the support in producing maps for the outcome of this work. To all the reviewers of this work, we also extend our gratitude to you for the help in finalizing the fine details of this analytical work.

Authors: Daniel Tsegai, Stephen Adaawen and Felix Girault (2019)



SUMMARY

Drought affects all parts of our society, from food production to public health. This has informed the growing need to help Parties, communities, agriculture, businesses, and individuals threatened by drought to plan accordingly. More than 70 countries are participating in the Drought Initiative, adopted at the 13th Conference of Parties (COP 13) which took place in Ordos, China. These countries are currently going through the process of enhancing national drought preparedness and planning.

This paper is the first attempt to analyse and learn from the first batch of about 35 National Drought Plans which have been completed and endorsed by the countries. Preliminary analysis of the drought plans indicates that drought impacts are more pronounced on water resources and agriculture. Generally, drought risk reduction at the country level is mostly reactive. Countries also recognize the gendered differentiation of drought impacts on women, men, and children. Much more importantly, the need for drought impact mitigation and policy to focus more on protecting women and young people as the most vulnerable sections of society is highlighted. Effective monitoring, forecasting, and impact mitigation for enhanced drought resilience are also widely emphasized across the NDPs. Gender mainstreaming and meaningful participation in planning and implementation for drought mitigation strategies, the need for adequate technology, policy framework, and expertise for effective drought monitoring and early warning, as well as cross-sectoral coordination, were also enumerated by country.



1. INTRODUCTION

Drought remains a complex and insidious natural hazard that has consistently posed risks and affected almost every society across the globe (Wilhite, 1993; 2000). As a recurring extreme but creeping climatic event, its physical manifestation is often characterized by a prolonged period of minimal or lack of precipitation (Dai, 2011). Drought has generally been a normal part of climatic variation, often aggravated by anomalies in sea surface temperatures (SSTs). This notwithstanding, the phenomenon has become more frequent, widespread, and intensive in the wake of ongoing changes in global climatic systems (IPCC, 2001; 2018). The increasing severity and spatial extent of droughts have been the cause of disasters (Duguma et al., 2017). Out of the 411 million people that were affected by disasters across the globe in 2016, 94% of them were related to drought (Guppy and Anderson, 2017).

Currently, it is projected that about 1.8 billion people across the globe will experience acute water shortages due to drought impacts, whilst two-thirds of the world will live under water-stressed conditions by 2025.¹ Within the period of 1900 – 2013 alone, a total of 850,000 lives were lost, and another 350 million people afflicted by drought events in Africa (Luetkemeier and Liehr, 2019). Several studies also point to drought impacts, centered around competition for scarce resources, as the cause of famines, conflicts, displacement, and migration with adverse implications for human security (Raleigh and Urdal, 2007; Hendrix and Glaser, 2007; Hummel et al., 2012; Cabot, 2017). The expectation is that droughts will, in the face of climate change, become more frequent and severe with far-reaching impacts across the different regions of the world (WMO &GWP, 2014). In line with the foregoing background, there have been sustained international

¹ <https://www.unccd.int/issues/land-and-drought>, accessed 11.06.2019

efforts at enhancing drought preparedness and resilience through effective monitoring, early warning, and response (Brüntrup and Tsegai, 2017). This has seen some relative progress in prompting a more proactive approach to drought.

1.1 Towards Effective Drought Management

Recent efforts and relative progress in the assessment and management of drought have witnessed some revolution with a shift from reactive to a more proactive approach to drought management (Crossman, 2018). The emphasis on a proactive approach has translated into a much more resolve at better land and water resources management in improving ecosystem health and services. The High-level Meeting on National Drought Policy (HMNDP) in March 2013 was a turning point which promoted the shift from a reactive to proactive approach to drought. The WMO/GWP Integrated Drought Management Programme (IDMP)², as well as the UN-Water Initiative led by the UN-Water Decade Programme on Capacity Development are two distinct outcomes of the HMNDP. The IDMP supports regions and countries to develop more proactive national drought policies (WMO and GWP (2014)).³ The UN-Water Initiative carried out a series of regional capacity building workshops to support countries to develop national drought policies following a 10-step process as presented in WMO and GWP (2014). The regional workshops also outlined the ‘3 key pillars’ of national drought policy, namely: i) implement drought monitoring and early warning systems; ii) complete vulnerability assessments for sectors, populations and regions vulnerable to drought, and; iii) implement drought mitigation measures that limit the adverse impacts of drought and provide appropriate response measures when drought occurs.

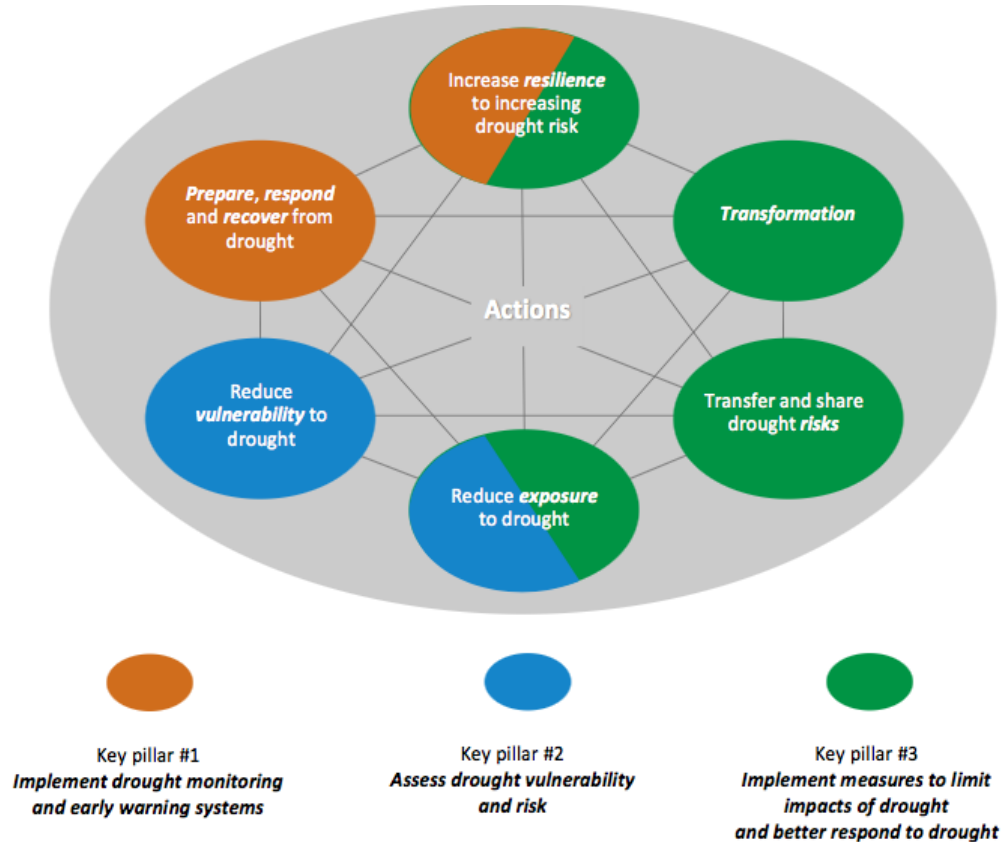
This informed the need for an integrated and multi-pronged policy framework primarily geared at reducing drought risks and impacts. In this light, the ‘Drought Resilience, Adaptation and Management Policy’ (DRAMP) Framework evolved as a comprehensive guide for an integrated and holistic approach to effective drought risk reduction and management (Figure 1) (Crossman,

² <http://www.droughtmanagement.info/>, accessed 19.11.2019

³ World Meteorological Organization (WMO) and Global Water Partnership (GWP), *National Drought Management Policy Guidelines: A Template for Action* (D.A. Wilhite). *Integrated Drought Management Programme (IDMP) Tools and Guidelines Series 1*. 2014: WMO, Geneva, Switzerland and GWP, Stockholm, Sweden.

2018). Essentially, DRAMP aims at reducing exposure, vulnerability and facilitating better management of drought across drought-prone countries.

Figure 1 Drought Resilience, Adaptation and Management Policy Framework (DRAMP)



Source: Crossman (2018, p.18)

The six cross-cutting goals of the DRAMP framework outline actions to guide the design and implementation of drought policy at both national and sub-national levels (Crossman, 2018). These goals are organized around three key pillars: a) implementation of drought monitoring and early warning systems; b) assessment of drought vulnerability and risk; and c) implementation of measures to limit impacts of drought and better respond to drought. Within the context of the 2013 HMDNP, the Integrated Drought Management Programme (IDMP) was also advanced by the Global Water Partnership (GWP) and the World Meteorological Organisation (WMO) (GWP & WMO, 2014). Following the prescription of a 10-step comprehensive National Drought Management Policy Guidelines (NDMP) as part of the IDMP, the two policy initiatives (IDMP and NDMP) collaboratively provide the framework for countries to develop their national drought management policies (Ibid.).



2. DROUGHT INITIATIVE AND THE NATIONAL DROUGHT PLANS

Alongside the aforementioned policy frameworks, the United Nations Convention to Combat Desertification (UNCCD) has also identified drought resilience as an integral component of its 2018-2030 Strategic Framework. As stated in strategic objective 3 of the UNCCD’s Decision 7/COP.13, the convention seeks to “mitigate, adapt to, and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems.”⁴The goal is to increase the resilience of communities and ecosystems to drought through sustainable land and water management practices. Hence, the ‘Drought Initiative’ was launched by the UNCCD with the sole aim to enhance drought preparedness systems, facilitate regional efforts to reduce drought vulnerability and risk, in order to boost the resilience of people and ecosystems.

In this regard, the UNCCD recognizes efficient planning as critical to achieving drought resilience. Thus, the convention has sought to enhance drought preparedness and resilience by assisting countries to develop their own national drought action plans (NDPs). A voluntary guideline and a model national drought plan of an 8-step process was developed to support countries in the process of drafting the national drought plans.⁵ Through the complementary design of a drought toolbox, the effort at effective drought response and management is envisioned around the three key pillars that have been highlighted by the DRAMP framework (see Figure 1). Ultimately, the aim is to stimulate a radical shift in the approach to drought management from reactive and crisis-based to a more proactive and risk-based one. That is to help countries in building drought resilience through the design of concrete actions for drought preparedness.

⁴ https://www.unccd.int/sites/default/files/relevant-links/2018-08/cop21add1_SF_EN.pdf, accessed 14.06.2019.

⁵ <https://www.unccd.int/sites/default/files/relevant-links/2018-06/model%20drought%20plan.pdf>, accessed 08.08.2019.

As part of the efforts of the UNCCD and its partners, many countries across the globe have actively registered their commitment to developing national drought plans as part of the UNCCD ‘Drought Initiative’. This analytical work thus set for itself the task of examining and summarising 35 National Drought Plans (NDPs) that have so far been submitted by the participating countries. As such, the following section gives an overview of these countries that are at different stages of preparing their NDPs. The overview is highlighted along regional clusters to give insights on the number of participating countries across the regional divide.

2.1 Participating Countries (National Drought Plans)

Following the call for the development of national drought plans (NDP), a total of 72 countries) have so far expressed their interest. But It should be noted that this analytical work is based on only the 35 countries (highlighted in the map: Figure 2) that had developed and submitted or were at various stages of developing their NDPs at the time of writing this document.

Figure 2 Map Showing 35 Countries of the Drought Initiative

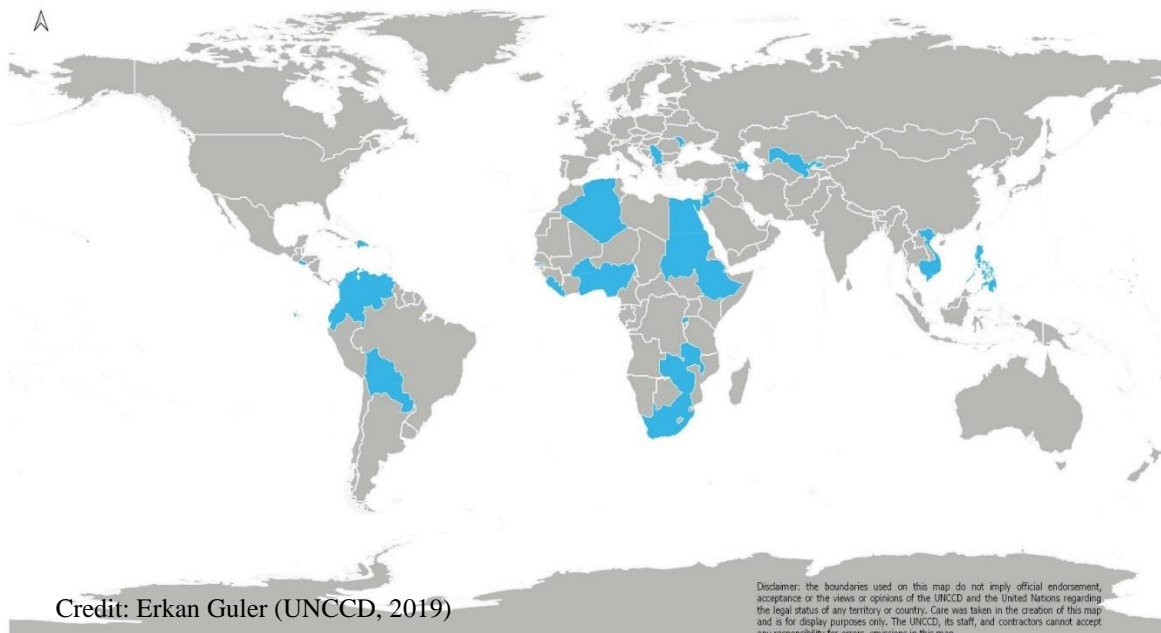


Table 1 gives a breakdown of countries that have been considered for the purposes of this analytical work. As can be seen in Table 1, there are variations across the regions in terms of the number of countries that have so far submitted or are at different stages of completing their NDPs.

Table 1 Participating Countries by Regional Cluster⁶

Region	Countries	Number	Percentage
Africa	Algeria, Benin, Burkina Faso, Egypt, Ethiopia, Ghana, Liberia, Malawi, Nigeria, Rwanda, Sierra Leone, South Africa, Sudan, Gambia, Togo, Zambia, Zimbabwe	17	48.6
Asia	Cambodia, Jordan, The Marshall Islands, The Philippines, Uzbekistan, Vietnam	6	17.1
CEE	Azerbaijan, Macedonia, Moldova; Serbia	4	11.4
LAC	Bolivia, Colombia, Dominican Republic, Ecuador, El Salvador, Grenada, Paraguay, Venezuela	8	22.9
Total		35	100

Source: Authors' compilation (2019)

For the total number of countries (35 as of June 2019) that have so far submitted or are in the process of revising their NDPs, it is observed that close to half (48.6%) are in Africa, followed by LAC (22.9%), Asia (17.1%) and CEE (11.4%) countries respectively (Table 1). The difference in terms of the number of national drought plans or participating countries may seem to give an impression of perhaps drought risk being only high in Africa. However, it is important to draw attention to the fact that drought events and impacts continue to afflict every region across the globe. Hence, the high representation of NDPs from Africa is perhaps due to the sheer number of countries (21 as of June) that had so far confirmed their commitment to the UNCCD 'Drought Initiative' relative to the other regional clusters.

For the analysis of the NDPs, it should be noted that no conventional survey or data was collected by way of questionnaires or in-depth interviews. The approach is mainly based on text analysis by way of gleaning information from the NDPs under consideration in order to highlight lessons or insights that could be drawn from the NDPs.

⁶ Countries participating in the Drought Initiative but not considered in the analysis shown in appendix 1



3. DROUGHT IMPACTS

Overall, a host of drought-related impacts (direct & indirect) have been enumerated by the countries. For all the NDPs examined, there are observable overlaps across the regional divide in terms of the impacts. However, these impacts have further been categorized into direct and indirect impacts. The direct impacts basically reflect the proximate or direct effects of drought on environmental and socio-economic systems. The indirect impacts, on the other hand, highlight the remote effects mainly triggered by drought. The impacts as enumerated by the NDPs are highlighted in Table 2.

Table 2 Direct Drought Impacts by Sectors

Direct Impact	Region			
	Africa (%)	Asia (%)	Latin America and Caribbean (LAC) (%)	Central and Eastern Europe (CEE) (%)
Agricultural losses (crop, livestock....)	100	100	100	100
Water scarcity/shortages	100	83	86	100
Threats to biodiversity	71	50	43	0
Impacts on forestry	59	17	71	50
Energy/power generation	59	17	57	25
Impacts on tourism	47	33	43	0
Transportation (navigability, asphalt...)	29	0	29	0
Impacts on mining	12	0	29	0

Source: NDPs analysis (2019)

Key highlights:

- **Agricultural losses:** Drought impact on agricultural production has been widely reported by countries in their NDPs. All the countries allude to drought impacts on the crop, livestock, and fisheries production. Aside from the general decline in quantity and quality of yields (productivity), the adverse impact on livestock production and pastoral livelihoods has particularly been of grave concern to a significant majority of the countries. The deteriorating environmental conditions have, in tandem with a decline in water and fodder, been widely noted as affecting the health of livestock. As a consequence, many countries have reported reduced production of dairy products, disruptions in seasonal migration patterns (especially for pastoralists), and increased risk of conflicts amongst communities relying on land and water resources.

Some of the NDPs have observed declines in yields for especially maize, beans, and livestock production due to lack of water, fodder, and pasture for animals (e.g. Bolivia, El Salvador & Ecuador). Grenada, for example, reports a decline in agriculture productivity, forestry, tourism, and financial activities that depend on these sectors. Similar observations have been made in the Dominican Republic with visible impacts on the production of especially bananas, beans, and vegetables. The NDP for Serbia specifically noted a significant decline in crop farm productivity, especially for irrigated agriculture, and up to a 50% decline in yields for maize. Azerbaijan and Moldova also admit to observed impacts on grain and cotton production due to severe droughts with increased risks of food insecurity.

On the other hand, a third of all the countries also admit to adverse impacts on inland fisheries. These impacts have tended to stall GDP growth with adverse implications for national economic growth, food security, and stability in most of the countries. In the Philippines, for example, drought impact on the crop, livestock, fishery, and dairy production has reportedly contributed to high rates of unemployment and loss of farm income, as well as a general decline in agricultural productivity across most parts of the country.

- **Water scarcity:** the drought-induced decline in precipitation and run-off and the enormous impact on freshwater availability has also been mentioned by all the country NDPs. The

effect of drought on freshwater availability is having a heavy toll on human health, hydroelectric power generation, reduced water availability for household, industrial and agricultural use, as well as posing severe constraints to the tourism and transportation sectors for all countries across the regional divide. In Colombia, severe droughts across the LAC region have been the cause of acute water shortages and rationing in the different departments across the country. As in other Latin American countries like Brazil and Ecuador, lower river discharges in Columbia have greatly constrained the generation of sufficient hydroelectric power, as well as navigation and transport of goods on the Magdalena River.⁷ The Vietnam NDP, also indicates that hundreds of thousands of hectares of arable land have been left unused due to the problem of drought-induced water shortage in especially the Red and Mekong River Delta areas.

As illustrated in Table 2, all African and CEE countries (100%) and more than three-quarters of Asian and LAC countries respectively pointed to the challenge of water scarcity/shortage due to recurring droughts. This has had devastating effects on transportation. Most especially, countries like Egypt (Aswan High Dam & Reservoir), Columbia (Magdalena River)⁸, Nigeria (Kainji & Jebba Dams) and Malawi (Lake Chilwa – Chisi Island) that seem to utilize inland waterways for hydroelectric power and carting goods have, for example, bemoaned the severe constraint to effective power generation, navigation, and transportation in their NDPs. Similarly, Egypt and Algeria report the effect of both meteorological and hydrological drought on lower river discharges, reduced groundwater, poor water quality [high nitrate concentration], fluoride (Ethiopia)] and inadequate water supply for households and the agricultural sector. In Burkina Faso, water scarcity is found to increase the burden on women and children in getting access to water.

- **Threats to Biodiversity:** The impact on biodiversity is particularly pronounced in both African (71%) and Asian (50%) countries. On the other hand, CEE countries report impacts on agriculture, water resources, and forestry as considerably high. Whilst CEE countries suggest no looming threat to biodiversity, a quarter in the region report impacts on energy/power generation. Similar observations can be made with less than a quarter of countries in the Asia region (17% of 6 countries) reporting impacts on forestry relative to

⁷ <https://www.worldaware.com/resources/blog/el-nino-impact-drought-likely-trigger-civil-unrest-colombia>, accessed 18.06.2019

⁸ <https://www.worldaware.com/resources/blog/el-nino-impact-drought-likely-trigger-civil-unrest-colombia>, accessed 18.06.2019

the high percentages recorded by the other regions. The increase in forest fires (see NDPs for Bolivia and Grenada) has tended to also aggravate loss of forest vegetation (71%) in the LAC region.

But, when it is considered that the extent of forest cover or level of drought-induced forest degradation, in part has a direct influence on biodiversity in any habitat, the relative differences (percentages) in threats or impacts on forestry and biodiversity in Asia seems a bit conflicting (See Table 2). Generally, two plausible reasons could be advanced for the observed differences. The first is the spate of drought-induced wild forest fires that have been reported in the NDPs of most Asian countries. Secondly, the issue of salinization of soils due to the saltwater intrusion has also been a major challenge facing countries in the region. The corresponding damage to biodiversity and ecosystem degradation (wetlands) in places like the Philippines and Vietnam may possibly explain the seeming differences in drought impact on forestry and threats to biodiversity in the Asia region.



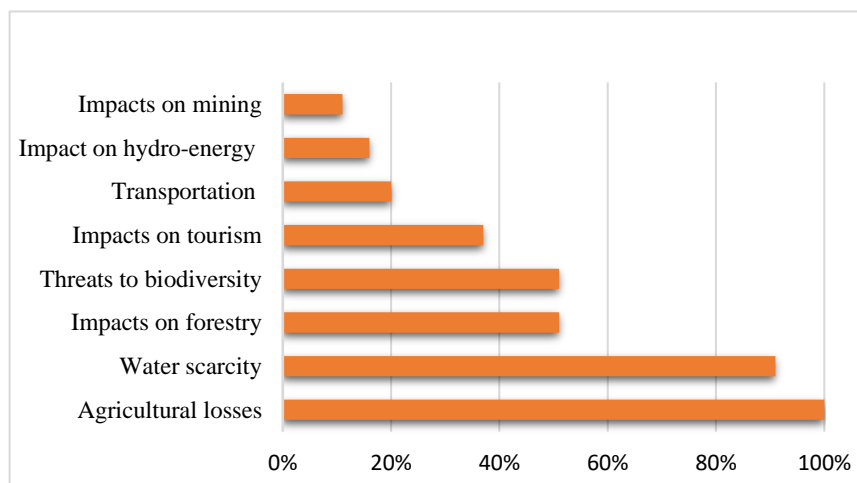
4. GLOBAL OUTLOOK

Global Outlook⁹

Having given some insights on drought impact across the regional divide, it would be equally important to have an appreciation of the global outlook on drought impact.

From Figure 3, the global situation (based on a combined analysis of drought impact in all the regions – Africa, Asia, LAC, and CEE) on drought impact seem to corroborate the concerns outlined in the country NDPs. With the global outlook, drought has been observed to significantly affect agricultural productivity and water scarcity.

Figure 3 Drought Impact: Global Outlook



Source: NDPs analysis (2019)

⁹ Based on the 35 NDPs

4.1 Indirect Impacts

As shown in the foregoing analysis, the agricultural sector stands out as the most affected by drought in all the country NDPs examined. The devastating impact on the sector has been reported as contributing to food shortages, high food prices, and imports.

Whilst drought-induced resource scarcity and food shortages have been the cause of displacement, loss of livelihoods, and migration in many places, most of the NDPs have identified water shortage and competition for pasture as the cause of acute conflicts and instability in vulnerable regions.

Countries also complained about the effect of drought on human health (see Figure 4). This is especially the case for more than half of the NDPs, where the issues of increasing incidence of water-borne and nutrition-related diseases have been attributed to droughts.

Other reports of heat stress, psychological problems, as well as diseases linked to air quality, have been mentioned as being indirectly triggered or caused by drought. In all these reports, it is noted that the poor and vulnerable sections of the population tend to suffer the most.





5. DROUGHT MITIGATION STRATEGIES

Drought mitigation, preparedness and response strategies together constitute the third pillar to effective drought management (Crossman, 2018, p.6). This pillar broadly encompasses structural measures (e.g. dams, desalination plants, water reservoirs...) or non-structural measures (e.g. policies, capacity building, awareness raising, drought-resistant crops, land use practices...) undertaken to limit the adverse impacts of drought. The overarching UNCCD ‘Drought Initiative’ seeks to promote a more proactive approach to drought management across countries. Despite this orientation, the proposed short-, mid- and long-term drought mitigation strategies outlined by the various NDPs can be broadly categorised into proactive and reactive strategies.

Essentially, the proactive strategies are concerned with reducing drought risk, as well as tackling the underlying causes of drought vulnerability. The reactive measures on the

Box 1

Drought Impact on Health: Malawi

In Malawi, drought impact on health is reflected in the form of nutrition-related effects, water-related diseases, airborne and dust-related diseases, as well as vector-borne diseases and mental health effects. Drought-induced acute food shortages in the country have reportedly increased the risk of malnutrition amongst the most vulnerable population. The suggestion is that predominantly stagnant and dried up water bodies, dry and dusty air, coupled with unhygienic practices during the drought have resulted in an increase in the cases of top five diseases: Malaria (23.1%), skin infection (39.9%), ARI (19.9%), diarrhea (18.2%), and eye infection (8.0%) compared to the baseline year of 2013-2014 (Gov’t of Malawi, 2016). This has seen the government spend a lot of money in the management of illnesses, treatment, as well as disease control, and surveillance activities.

Whilst the issue of malnutrition has generally been endemic in the country, there has been a high incidence of malnutrition during periods of drought. The most recent drought (Oct/2015-March/2016) accounted for a 30-100% increase in new admissions for Severe Acute Malnutrition (SAM) and Moderate Acute Malnutrition (MAM), as well as the increase in adolescents and adults living with HIV/AIDS as compared to the same period in 2013-2014 (Ibid.). In effect, drought events in Malawi have tended to increase risks and vulnerability in Under 5-year-old children and people living with HIV, due in part to inadequate food intake and deterioration of nutrition status.

(Source: Malawi NDP).

other hand, are concerned with addressing the impacts of drought or may simply be conceived as a response to (potential) crisis.

5.1 Proactive Drought Mitigation Strategies

There are discernible differences in the measures or strategies proposed or being undertaken to tackle drought impacts across the different countries. As earlier noted, countries experience different levels and types of drought-related challenges. Hence, the mitigation strategies that are being undertaken or proposed in the NDPs also appear to reflect what seem to be the most pressing drought-related challenges that may be affecting a country.

Table 3 Proactive Mitigation Strategies by Region

Strategy	Region			
	Africa (%)	Asia (%)	Latin America and Caribbean (LAC) (%)	Central and Eastern Europe (CEE) (%)
Education and sensitisation	76	100	86	100
Enhancing water supply	76	100	100	50
Monitoring, forecasting & early warning	71	83	86	50
Improved agricultural practices	65	83	86	75
Land use planning	59	33	71	25
Improved irrigation	47	83	71	75
Sizing & managing water demand/use	41	67	57	75
Reforestation	41	33	57	50

Source: NDPs analysis (2019)

Key highlights: From Table 3 and also from the global out illustrated in Figure 5, the majority of countries endorse education and sensitization of vulnerable populations, enhancing water supply, monitoring, forecasting, and early warning, and as well, improved agricultural practices as key strategies to drought management in their NDPs.

- **Education and sensitization:** As a non-structural drought mitigation strategy, it entails capacity building and training of farmers in addressing or coping with drought impacts, the

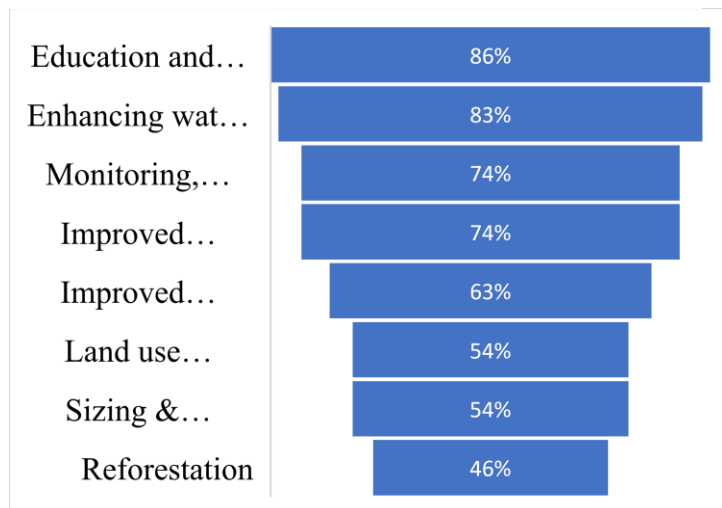
integration of drought, and issues of desertification in basic school and university curricula. The strategy also focuses on the sensitization of vulnerable communities and decision-makers on drought, as well as the establishment of drought information centers. For example, the Republic of Benin as part of its mid-term drought mitigation strategy advocates

the establishment of drought information centers. . As a long-term strategy, the country proposes, within the context of its education program, to develop and implement sensitization programs on water treatment and conservation for households; water harvesting techniques; nutrition and gardening at home; risks and impacts of drought, especially for vulnerable people.

In the CEE region, Azerbaijan as part of its proposed education and sensitization programs recommends the establishment of a task group responsible for training activities, identification of decision-makers and vulnerable groups that may be potentially affected by drought, and the development of training manuals for vulnerable populations. In similarity with these recommendations, Serbia also advocates the design of an educational program for farmers regarding the use or implementation of improved agricultural practices. The Serbia NDP also advocates for public education on coping and mitigation measures to drought impact. The conviction is that when vulnerable populations are informed and trained on innovative ways of responding or coping with drought impacts, it would enhance their preparedness and resilience to drought.

- **Enhancing water supply:** Inadequate water availability for agricultural, domestic, and industrial use has become a big challenge for countries in the face of recurrent droughts. In response, the majority of countries have in their NDPs placed emphasis on improving water supply, management, and use through voluntary conservation, restrictions, and mitigating

Figure 4 Proactive Strategies: Global Outlook



Source: NDPs analysis (2019)

misuse of water in their NDPs (e.g. Ethiopia, Egypt). In particular, the implementation of rainwater harvesting systems and construction of water storage infrastructure were the most common measures mentioned by countries as crucial to enhancing the national water supply, whilst other countries also acknowledge the urgency to reduce water loss arising from leakages, as well as the need to treat and reuse wastewater (e.g. for agricultural purposes) (See Figure 6).

Figure 5 Main Mitigation Measures in Drought and desertification –

<p>Rainwater harvesting</p> <p>Ghana, Ethiopia, Sudan, Nigeria, Malawi, Sierra Leone, Gambia, Zambia, Zimbabwe, Uzbekistan, Philippines, Marshall Islands, Jordan, Serbia, Grenada, Dominican Republic, Ecuador, El Salvador, Venezuela, Burkina Faso, Benin</p>	<p>Groundwater extraction</p> <p>Ghana, Sudan, Rwanda, Malawi, Gambia, Zambia, Philippines, Marshall Islands, Cambodia, Azerbaijan, Dominican Republic, Burkina Faso</p>	<p>Watertransfer (channels, pipelines, trucks...)</p> <p>Ethiopia, Sudan, Malawi, Gambia, Zambia, Zimbabwe, Vietnam, Jordan, Azerbaijan, El Salvador, Algeria</p>	
<p>Reservoirs lakes, water storage</p> <p>Egypt, Ethiopia, Sudan, Rwanda, Malawi, Zambia, Zimbabwe, Uzbekistan, Vietnam, Marshall Islands, Jordan, Moldova, Grenada, El Salvador, Venezuela, Bolivia</p>	<p>Leakage reduction</p> <p>Sudan, Philippines, Marshall Islands, Jordan, Moldova, Serbia, Dominican Republic, Ecuador, Venezuela</p>	<p>Wastewater treatment facilities</p> <p>Ethiopia, Nigeria, Zambia, Jordan, Serbia, Venezuela, Burkina Faso, Algeria</p>	
		<p>Desalinisation and treatment plants</p> <p>Egypt, Ethiopia, Marshall Islands, Jordan, Venezuela, Algeria</p>	<p>Cloud seeding</p> <p>Philippin... Jordan</p>

Source: NDPs Analysis (2019)

In the Algeria NDP, for example, much attention is given to the mapping of surface water and groundwater reserves for each watershed, reuse of sewage water for irrigation, construction of desalination plants (to treat salt and brackish water) (see also Jordan NDP, drip irrigation, improvement of the legal framework on water use and on the (illegal) exploitation of wells, as well as facilitating water transfer between watersheds). The proposed actions enumerated by Columbia ranged from managing or reducing water demand to developing educational programs on sustainable water and energy use, risks of wildfires, risks of heat- and water-related diseases, and developing alternative water supply options.

Box 2
Enhancing Water Supply in Cambodia

With temperatures across the globe projected to further increase to about 1.5°C by 2050, the suspicion is that this would have negative impacts on water availability in the agricultural sector, which is the mainstay of majority of people in Cambodia. In responding to these challenges, the Ministry of Agriculture, Forestry, and Fisheries (MAFF), and Ministry of Water Resources and Meteorology (MoWRAM) accordingly developed a strategy for agriculture and water in 2007. The vision was to ensure enough, safe and accessible food and water for all people, reduce poverty and contribute to economic growth (GDP per capita). Also, the strategy was aimed at ensuring the sustainability of natural resources in contributing to poverty reduction, food security and economic growth through: (a) enhancing agricultural productivity and diversification and (b) improving water resources development and management (MAFF & MoWRAM, 2007). MoWRAM also developed the climate change action plan for 2014-2018. In addition to strategies geared at improving flood and drought management, the plan promotes scientific and comprehensive methods on ground water study in responding to drought and climate risks.

In meeting the water needs of people, the government has tried to: i) maintain, preserve, and diversify water resources in the rainy season (dam, canal, stream, drain, etc.) and ii) provide water for irrigation during the dry season in parallel to the use of agricultural diversification system. In addition, the government has developed a policy in trying to keep forest cover at 60% of the total area of the country by allocating many new forest areas as protected forests. The expectation is that this will not only contribute to forest protection and biological conservation, but also water conservation. Conservation agriculture has also been promoted in some provinces such as Kampong Cham, Kampong Thom and Battambang. This has enhanced soil protection, as well as soil moisture protection from evaporation so that crops that are planted in an area can cope very well with drought condition.

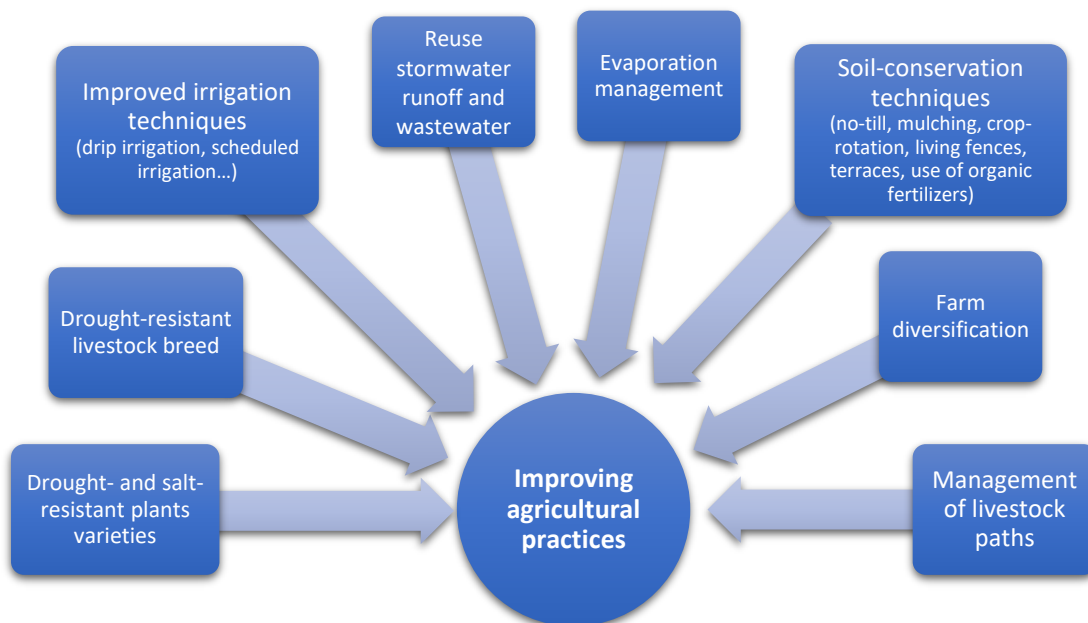
(Source: Cambodia NDP, 2019)

- **Monitoring, Forecasting, and Early Warning:** The case for drought monitoring, forecasting, and early warning as key to drought preparedness and management were also widely stated in almost all the country NDPs. In similarity to The Marshal Islands, The Philippines subscribe to maintaining current drought monitoring systems, forecasting, and

EWS, improving drought monitoring and EWS through the use of remote sensing, building community networks for decentralized community-run EWS, installation of new automated agro-meteorological stations in highly vulnerable areas, as well as assessment and mapping of drought risk, capacity building, development of GIS databases, and Installation of communication equipment for remote areas and establish multi-media information campaigns. Jordan also stresses the development of EWS and policies, regulations, and enforcement mechanisms to improve drought preparedness.

Altogether, more than 60% of the countries presented measures at improving agricultural practices as proactive strategies that could be pursued in promoting drought resilience (Figure 7). These measures ranged from the cultivation of drought-resistant crops and livestock breeds to the implementation of soil-conservation techniques amongst other measures. The aim is that the implementation of the different set of techniques will contribute to sustainable agriculture, reduce water wastage and improve drought resilience across countries.

Figure 6 Main Measures at Improving Agricultural Practices as a Mitigation

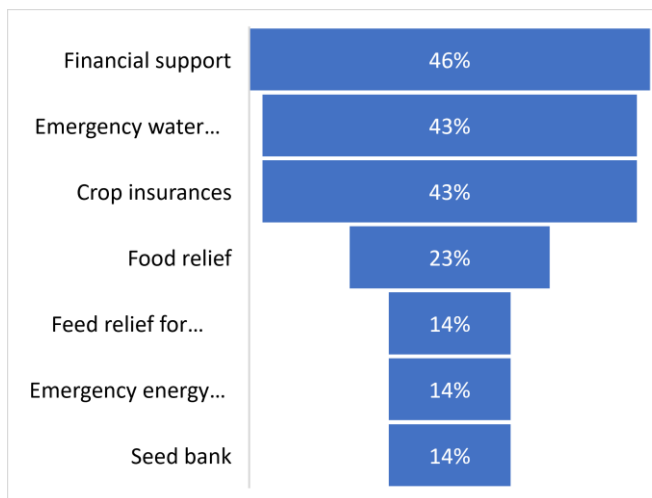


Source: Authors' construct based on NDPs

5.2 Reactive Mitigation Strategies by Regional Clusters

With the reactive mitigation strategies, the NDPs basically outline the responses or actions aimed at addressing drought impacts. These measures, as highlighted by the countries, mainly relate to post-drought recovery through immediate corrective actions or support to return drought-affected systems to ‘normal’ capacity. From the analysis, various responses including the provision of financial support, emergency water supply, crop insurance, and food relief among others have been presented in the NDPs as reactive measures to addressing drought impacts across the countries.

Figure 7 Reactive Mitigation Strategies: Global Outlook



Source: NDPs analysis (2019)

Table 4 Reactive Mitigation Strategies by Region

Strategy	Region			
	Africa (%)	Asia (%)	Latin America and Caribbean (LAC) (%)	Central and Eastern Europe (CEE) (%)
Emergency water supply	41	50	43	50
Food relief	41	0	14	0
Feed relief for livestock	24	0	14	0
Emergency energy supply (fossil fuels)	18	0	29	0
Crop insurances	53	33	29	50
Financial support	59	17	43	50
Seed bank	29	0	0	0

Source: NDPs analysis (2019)

Key highlights:

- **Financial support:** For the majority of countries (see Table 4 and Figure 8), financial support to affected or vulnerable persons/communities is listed as a reactive measure for drought in their NDPs. In Burkina Faso, the provision of financial support is reflected in facilitating the access of women and young people or vulnerable communities to microfinance, support funds for youth activities, access to land for especially women and young people, or financing the creation of agricultural or agribusiness enterprises. Uzbekistan recommends the provision of financial support for farmers and manufacturers of agricultural products as a key response to drought impact. Other countries like Ghana, Sierra Leone, and Liberia identify the mobilization of both financial and technical support, or establishment of a drought fund for farmers, manufacturers of agricultural inputs, as well as the effective implementation of NDPs and functioning of drought preparedness networks, as also crucial to enhancing drought resilience amongst vulnerable groups or communities.
- **Crop insurance:** Whilst crop insurance was also mentioned as a viable reactive measure by a considerable number of countries, the consideration was relatively widespread across the African and CCE countries (see Table 4). A little more than half of the NDPs of African and CEE countries enlisted crop insurance as a strategy that could easily make the much-needed financial support available to vulnerable or affected

Box 3

Drought response through the PSNP: Ethiopia

As part of Ethiopia's response to the drought emergencies, the government has set up a contingency budget within the context of the Productive Safety Net Programme (PSNP). The PSNP's contingency budget is a multi-donor trust fund (MTDF) that offers financial support to the government's social safety net program. As the second-largest safety net program (after South Africa), the PSNP is aimed at helping households to overcome vulnerabilities without compromising the ability to build their assets over time.

With the program (PSNP III 2009-2015), drought management was done through the woreda contingency budgets and Risk Financing Mechanism (RFM). The woreda contingency budgets are basically concerned with addressing issues of vulnerability in supporting (chronically) food-insecure households in rural areas to meet their basic needs. These budgets were essentially used prior to the release of funds (depending on the severity of the shock).

With the PSNP-RFM designed to specifically respond to drought impacts, the program makes payments to beneficiaries based on a specific criterion (mostly those who suffer from insecurity due to drought).

Following PSNP IV, drought management no longer depends on regional level contingency budgets as in PSNP III where budgets could be rolled over to the following season. The PSNP III-RFM is replaced by a federal-level contingency budget. Whilst the PSNP IV continues to draw on woreda contingency budgets, major drought shocks are mostly tackled using federal-level contingency budgets.

(Source: Ethiopia NDP, 2019)

populations through improved insurance schemes, and as well access and timely payment of insurance or compensation (e.g. Burkina Faso, Togo, Zimbabwe, and Sierra Leone). In the case of the Africa region, improved insurance and timely payment is expected to be enhanced within the context of the African Risk Capacity initiative¹⁰. Whereas the CEE countries of Serbia and Moldova, for example, recognize the importance of granting access to crop insurance for farmers, the Marshall Islands NDP stresses the need to investigate risk financing options such as insurance and Public-Private-Partnerships. In the case of Venezuela, the NDP does not only endorse the development and improvement of crop insurance schemes but also acknowledges the need to consider other innovative funding mechanisms for vulnerable or affected populations.

Although emergency food and feed relief, and seed banks were other notable response strategies that particularly seemed appealing to African and LAC countries, the prescription of emergency water supply was endorsed by the majority of countries across the regional divide (Table 4). Half of all Asian and CEE countries (50%) analyzed, respectively placed emphasis on emergency water supply as vital to emergency relief during periods of drought. With the NDP for Moldova, the call for improved emergency response capabilities is not only limited to the swift emergency water supply but also the procurement and distribution of vegetable seedlings and maize seeds, as

Box 4 Agricultural Insurance in Moldova

In tackling risks to production in the Agricultural Sector, the law on “Subsidy Insurance against Production Risks in the Farming Sector” (Law no 243-XV) was formulated by the Government of Moldova on the 8th July 2004. As of 2017, 9 companies had registered to provide agricultural insurance in the country. However, only 2-3 of the companies have a high market share of the expertise. Market penetration is also reportedly low (2-3%).

Whilst premium rates on total agricultural lands are quite high (e.g. premiums on different disaster events when insured separately, range from hail (5-6%), frost (1.5-3%), and drought (7-9%)). Meanwhile, subsidies for Agricultural Insurance account for roughly 1% of total agricultural subsidies.

A simple direct payment system is thus proposed as a viable alternative to stabilizing farmers' incomes whilst avoiding the associated insurance incentive problems. This approach is, however, more reactive or crisis management-oriented. The traditional hierarchical and command-and-control management methods make farmers and societies more reliant on government programs and as well, mostly on external assistance from donor organizations, resulting in increased vulnerability to drought events. Mutual funds are also being considered as alternatives to Agricultural Insurance. These funds are mostly centered around non-profit risk-sharing tools based on private agreements among farmers/members. Members contribute to a stabilization fund that is used to compensate losses according to agreed-upon rules. The main advantage of this is that members know one another. The solidarity amongst members reduces moral hazards and adverse impacts. The danger, however, is that most or all members of a regionally organized mutual fund incur losses simultaneously.

(Source: Moldova NDP, 2019)

¹⁰ <https://www.africanriskcapacity.org>, accessed 11.07.2019.

well as emergency supply of winter wheat seeds, allocations to cover the costs incurred by farmers on tillage and sowing of winter crops.

The Bolivia and Venezuela NDPs, for example, propose improvement in mechanisms aimed at enhancing water supply in cases of emergencies, whilst that of Vietnam approves the construction of water transportation systems between water reservoirs and lakes to increase water supply in affected areas. In the case of Sudan, attention is made regarding the rehabilitation and upgrading of existing irrigation schemes as well as emergency water supply systems. It is envisioned that a swift supply of water during periods of drought emergencies would contribute to reducing the impact on affected populations.



6. CONSTRAINTS TO ADDRESSING DROUGHT CHALLENGES

- **Political challenges:** The issue relating to lack of clear-cut or elaborate risk reduction strategies has been identified by countries as a major constraint to effective drought management. Most of the NDPs bemoan the lack of governmental (political) commitment at developing a comprehensive drought policy or blueprint that provides guidance or set out criteria on drought indicators, indices, declarations. This constraint creates a gap as to how to proceed in terms of communicating or initiating various mitigation and response actions to drought emergencies (see for example NDPs for Macedonia, Zambia, Sierra Leone, Rwanda and Ghana). Even for countries where there is an existing disaster policy, risk reduction or management of drought emergencies is often executed under disparate or ad hoc institutional arrangements. Drought management is often not sufficiently captured in national laws or regulations and hence, no streamlined protocols as to how to deal with drought-related risks or impacts. The lack of policy or diffused approach to drought management does not thus provide for effective drought mitigation efforts.
- **Institutional Challenges:** The lack of effective cooperation and coordination across institutions in tackling issues of drought is also a notable concern for countries. Many of the countries report the general lack of synergies in policy, and cooperation across the institutional divide, sectors and other stakeholders in drought management. Normally, countries are confronted with different institutional arrangements and focus with no collaboration in disaster risk reduction or emergency relief support. The situation is often compounded by weak decentralisation structures which also tend to hamper effective response and participation by other stakeholders in addressing drought impacts.

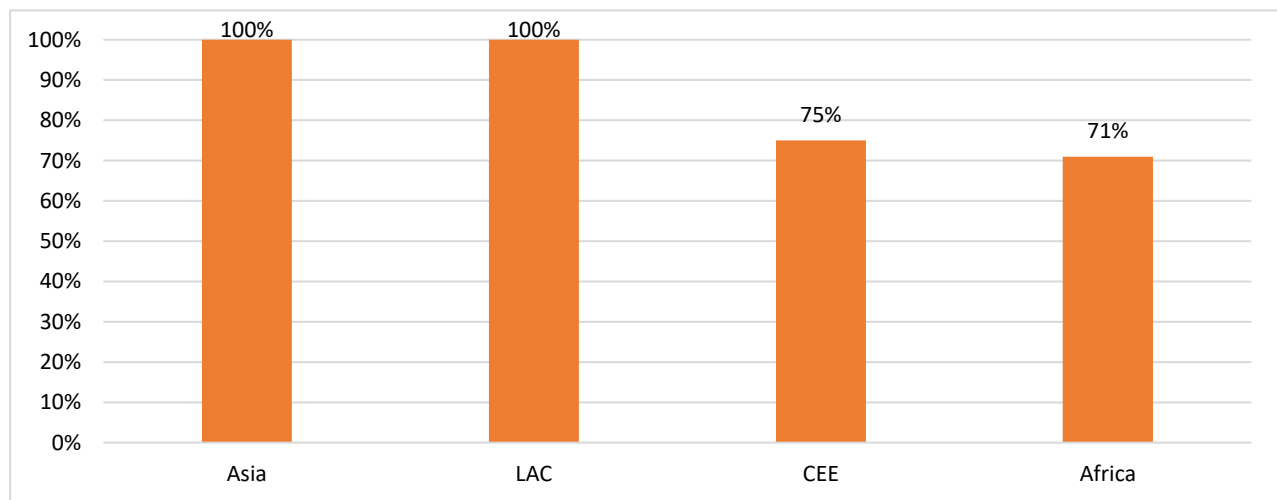
- **Technical challenges:** Almost all drought-prone countries are confronted with the lack of technology to facilitate the efficient monitoring and forecasting of drought. In instances where the technology is available at all, there is often a lag or insufficient adoption due to limitations on having the right expertise to use the technology. Other countries (e.g. Togo, Venezuela, Columbia), have also raised concerns relating to the insufficient or lack of manpower to tackle the wildfires that are often triggered by drought conditions.
- **Financial challenges:** Countries are also faced with the lack of financial resources to acquire the necessary technology and to fund the operations of the systems in charge of monitoring and issuing early warnings. This also includes the unavailability of emergency funds to adequately respond or provide emergency relief in times of drought and other disasters. Therefore, countries are mostly confronted with having to tackle drought disasters with limited financial resources. This often leads to adverse implications for drought preparedness and resilience.
- **Ineffective legislation/regulation Lapses:** The limited or lack of access to land tenure rights are often due to land scarcity, increasing commodification or socio-cultural factors that tend to misappropriate land to the advantage of a few powerful hands in society. Mostly, women, children and the poorer sections of societies tend to be marginalised in terms of landholding or access. Meanwhile, at the national or sub-national level, the integration of drought issues into land use planning has generally been missing or non-existent. These challenges tend to negatively affect the potential of making any progress in adequately addressing drought impacts.
- **Lack of awareness and participation in drought:** This constraint stems from the lack of sensitisation and awareness amongst the population. The situation is compounded by the limited or lack of qualified human resources in local communities to contribute in sensitising vulnerable populations on the drought risks, impacts and coping strategies. There is also low participation of civil society and private sector in drought management and other issues on the environment.



7. ISSUES OF GENDER AND DROUGHT MITIGATION

Issues of Gender¹¹ and Drought Mitigation

Figure 8 Gender Visibility in NDPs by Regions



Source: NDPs analysis (2019)

Key highlights: Overall, most of the countries do recognise the gendered vulnerability and varying impacts of drought on women, men and children. In particular, the NDPs acknowledge the vulnerability and enormity of drought impact on women and children as compared to their male counterparts. Many of the countries admit to the importance of women in facilitating education, awareness and mitigation to drought disasters.

¹¹ This highlights the number of countries that mentions or raises issues of gender; recognizes the differences in vulnerability and impact of droughts on men, women and children, and the strive to mainstream gender in mitigation strategies or disaster response in their NDPs

- As can be seen in Figure 7, countries have advocated for mitigation strategies to focus more on a gendered risk assessment of drought. This will involve gender mainstreaming and facilitating effective participation in the planning and implementation of activities focused on addressing drought impacts. With the NDP of Grenada, for example, it highlights the government's commitment to the inclusion of gender in drought management through the integration of gender equality into disaster management, climate change, and related strategies as a means of facilitating men and women's complementary roles in environmental management.
- With Egypt, the NDP recognises women (mothers) as the most trustworthy advisors in contributing to a resilient society against disasters as a first step to drought mitigation. Thus, the Egypt's NDP advocates the need for proper education and capacity building programmes for women. This is to empower them to be more effective in the community, particularly in highly drought-prone zones of the country.



8. KEY LESSONS LEARNT

From the analysis of NDPs submitted so far, it is evident that countries are grappling with the devastating effects of recurring drought disasters that tend to affect almost every sector across the globe.

Most importantly, the effect of drought on freshwater resources for domestic, agricultural and industrial use remains a critical challenge in all countries. For countries that depend much on river discharge, drought-induced decline in precipitation levels, reduced run-off and river discharge has not only posed risks to the very existence of populations but tended to affect critical sectors of the economy.

The agricultural sector remains the most vulnerable to drought impacts. Agricultural losses, food crisis and severe droughts trigger a host of health challenges related to malnutrition, psychological stress, changes in the spatial spread, morphology, and virulence of diseases. The related competition for water and other natural resources has been the cause of migration, conflict and displacement in vulnerable areas. What is also evident is that most of the countries recognise the gendered differentiation of drought impacts on women, men and children. Hence, there is the need for drought mitigation and policy to focus more on protecting women and young people as the most vulnerable and worst affected by droughts.

Generally, drought/disaster risk reduction or response at the country level is mostly reactionary, after the disaster/drought has brought far-reaching impacts on the affected persons/communities. Moreover, drought monitoring and preparedness in most countries are very rudimentary if not inadequate.

In all, the countries recognise the need for effective monitoring, forecasting and mitigation as vital to drought preparedness and resilience. Hence the need for adequate technology, policy framework and expertise for effective drought monitoring. The evidence also indicate that countries are committed to gender mainstreaming and ensuring effective participation in the planning and execution of activities and measures related to drought mitigation (e.g. Egypt, Sudan).

There is also an overwhelming emphasis on improving water supply or availability through rainwater/fog harvesting, improved irrigation systems, sizing water demand and use, as well as desalinisation and treatment of polluted/wastewater. Alongside, there is also growing commitment to improving agricultural practices. These commitments reflected in: the use of improved seeds to boost yields, drought resistant varieties and climate smart agriculture.

Aside from financial support, emergency food and feed relief to vulnerable groups like women, young people and affected communities, crop insurance has increasingly gained traction across countries as a viable option to improving drought resilience.

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APPENDIX

Full List Participating Countries by Region (Drought Initiative)

Region	Countries	#
Africa	Algeria, Angola, Benin, Burkina Faso, Botswana, Burundi, Central African Republic, Cote d'Ivoire, Egypt, Eritrea, Eswatini, Ethiopia, Gabon, Ghana, Guinea-Bissau, Liberia, Madagascar, Malawi, Mali, Mauritania (UfM), Morocco (UNDP), Namibia, Nigeria, Niger, Rwanda, Sierra Leone, South Africa, Sudan, The Gambia, Tanzania, Togo, Tunisia, Zambia, Zimbabwe, Somalia (UNDP).	35
Asia	Uzbekistan, Cambodia, The Philippines, India, Iran (UNDP), Iraq, Kuwait, Marshall Islands, Pakistan, Sri Lanka, Syria, Tajikistan, Turkmenistan, Vietnam, Jordan (UfM).	15
LAC	Argentina, Bolivia, Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Honduras, Panama, Paraguay, Perú, Venezuela	15
CEE	Azerbaijan, Bosnia and Herzegovina, Macedonia, Moldova, Montenegro, Russia, Serbia, Ukraine	8
Total		73



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