Global Drought Snapshot 2023

- the need for proactive action -

Contents

List of figures

Foreword by Ibrahim Thiaw

Drought - the quietest shade of loud

Drought quietly wreaks havoc on the only inhabitable planet we know of with far-reaching consequences for ecosystems, economies, and human lives. Unlike other disasters that attract media attention, droughts operate in silence, often going unnoticed and failing to provoke an immediate public and political response. This silent devastation perpetuates a cycle of neglect, leaving affected populations to bear the burden in isolation. As we witness the increasing frequency and severity of drought events, the data presented in this new edition of *Global Drought Snapshot 2023* serves as a wake-up call. Each figure presented in a first chapter, titled **PRESENT IMPACTS**, tells parts of the greater story and paints a vivid picture of the multiple impacts of drought. From dwindling reservoir levels to declining crop yields, from loss of biological diversity to famines, the numbers reveal the *"loud"* reality of drought. The majority of data points in this report were published within the last 24 months.

Drought knows no boundaries, affecting both developed and developing countries around the world. Its impact goes far beyond the immediate lack of water, as it engulfs communities and ecosystems in a pervasive web of interconnected destruction. While drought affects people from all walks of life, it has a disproportionate impact on vulnerable communities. Rural areas with limited access to water resources and inadequate infrastructure often bear the brunt of drought. Smallholder farmers, indigenous peoples and marginalized groups face immense challenges in sustaining their livelihoods during prolonged dry spells. Studies also revealed that women and girls carry the major burden of such impacts.

Drought has serious economic consequences, both locally and globally. In agriculture-dependent regions, drought-related crop failures lead to food shortages and often skyrocketing prices. Livelihoods are destroyed, with farmers and pastoralists

struggling to sustain their way of life. This affects local communities and can also potentially disrupt global food supply chains. The economic losses associated with drought are estimated to be in the billions of dollars annually.

To combat the negative effects of drought, global drought resilience is essential. A second chapter, called **POSSIBLE FUTURES**, shifts the focus away from the multiple negative and often cascading impacts to building resilience, which involves proactive measures that minimize vulnerability and enhance adaptive capacity. This encompasses various sectors, including agriculture, water management, and disaster preparedness. In addition, raising awareness and providing support to vulnerable communities can help build their resilience in times of drought.

A critical aspect of building global drought resilience is the promotion of land restoration, sustainable land management and nature-positive agricultural practices. By adopting nature-positive farming techniques, such as drought-resistant crops, efficient irrigation methods, no-till and other soil conservation practices, farmers can reduce the impact of drought on their crops and incomes. Several findings in this report highlight this fact.

Another key component of global drought resilience is efficient water management. These include the development of sustainable water supply systems, conservation measures and the promotion of water-efficient technologies. By investing in water infrastructure and improving water governance, countries can better withstand the challenges of drought.

Furthermore, improving disaster preparedness and early warning systems is essential for global drought resilience. Timely and accurate information on drought conditions enables proactive decision-making and effective responses. Investing in meteorological monitoring, data collection and risk assessment tools can help governments and communities enhance drought resilience by responding quickly to drought emergencies and minimizing their negative impacts.

In addition to these sector-specific measures, building global drought resilience requires international cooperation, knowledge sharing as well as environmental and social justice. Countries and organizations need to collaborate to exchange best practices,

lessons learned and innovative solutions. By fostering solidarity, partnerships and creating platforms for dialogue, the global community can collectively address the challenges posed by droughts.

The numbers presented in the new publication on drought speak volumes about the urgency of addressing this pressing issue. To combat the negative effects of drought, global drought resilience is not a matter of choice but a necessity. By prioritizing proactive measures, holistic landscape restoration, sustainable water management, regenerative agricultural practices and disaster preparedness, countries can reduce their vulnerability to drought and regenerate healthy ecological systems that all of humanity relies on for its well-being. By taking collective action, we can work to mitigate the negative impacts of drought and ensure a better future for generations to come.

PRESENT IMPACTS

Drought at a glance

The drought we made: Humans are responsible for all global heating over the past 200 years leading to a current temperature rise of 1.1°C above pre-industrial levels. This has led to more frequent and hazardous weather events including drought (IPCC, 2023) **[Global]**

Drought affects the poorest: 85% of people affected by droughts live in low- or middle-income countries (World Bank, 2023) **[Global]**

Drought consequences are global: For the first time, [scientists] have drawn on many terabytes of data to paint a full picture of the water cycle over a year for the entire globe. Alarming changes in the entire global water cycle [became apparent] (PhysOrg, 2023) **[Global]**

[Global] Based on data reported by 101 country Parties to the UNCCD, 1.84 billion people are drought stricken, out of which 4.7 per cent are exposed to severe or extreme drought (UNCCD, 2023)

Drought hits especially women and children: Compared to men, women and children are over 14 times more likely to be killed by climate fueled disasters. In addition to posing a direct threat to their lives, disasters expose women to other protection risks, [which are] acute in displacement contexts (DGAP, 2022) **[Global]**

Drought causes famine: As of the end of December 2022, the ongoing drought had left approximately 23 million people severely food insecure across the Horn of Africa (WFP,2023) **[Africa]**

Drought creates forced migration: 98 per cent of the 32.6 million new disaster displacements in 2022 were the result of weather-related hazards such as storms, floods and droughts. (Migration Data Portal, 2023) **[Global]**

Drought severity increases: Based on the Palmer Drought Index, severe to extreme drought affected about 5% of the contiguous United States as of the end of May 2023. (NOAA, 2023) **[North America]**

Drought has cascading effects: Drought conditions in the La Plata basin in Brazil–Argentina in 2022 were the most severe since 1944, impacting agriculture by reducing crop production and affecting global crop markets. (WMO, 2023a) **[South America]**

Drought impacts are on the rise: In 2022, Europe experienced its hottest summer and second warmest year on record, and consequently the largest overall drought impacted area – over 630,000km^2, as opposed to the 167,000km^2 annual average between 2000 and 2022 (EEA, 2023) **[Europe]**

Dire predictions: By the end of the century, the duration of moderate, severe and exceptional droughts in some regions of China will double, and the drought intensity will increase by over 80% (Yin et al., 2022) **[Asia]**

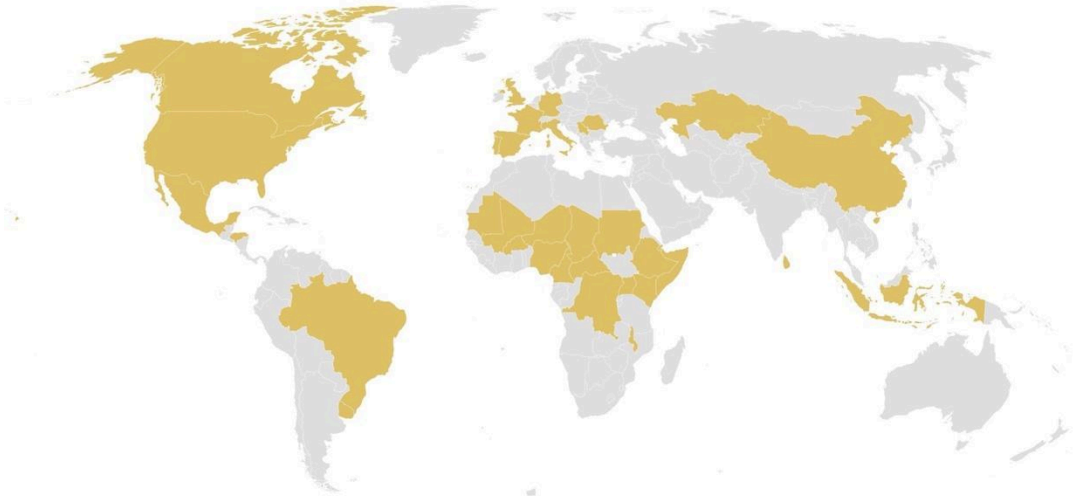

Fig. 1: Countries affected by drought (2022-2023)

(for UNCCD disclaimer see page 47, incl. maps)

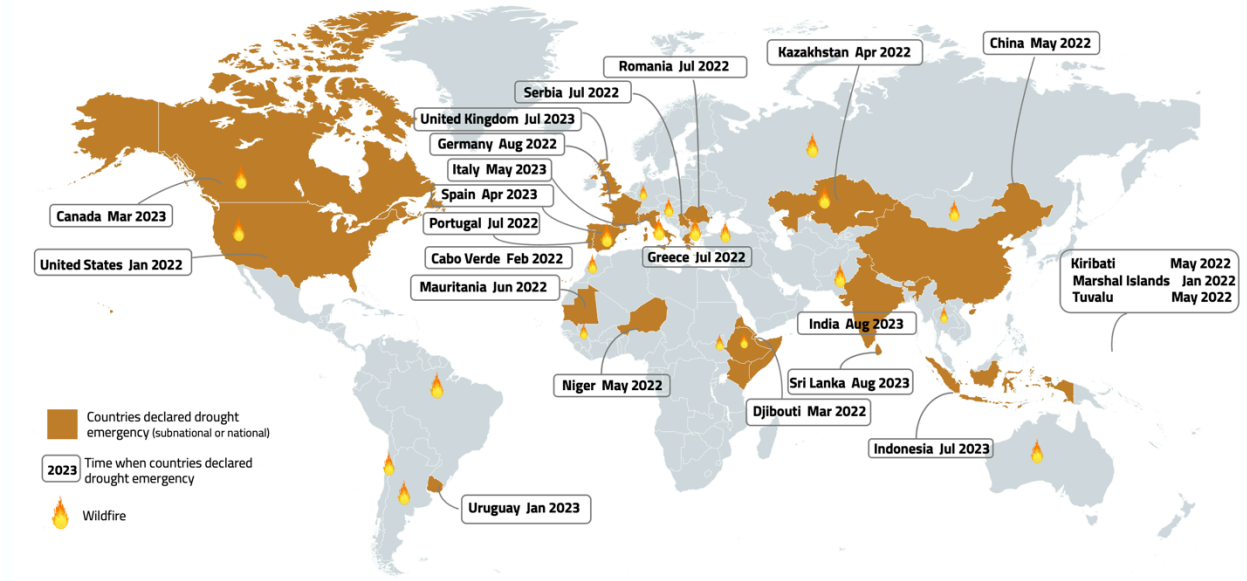

Fig. 2 List of countries declaring drought emergencies (2022-2023)

How are impacts being detected?

[Global] A recently developed method combined satellite measurements with high-resolution meteorological data, improving the resolution of the water distribution maps that are generated from around 300 kilometers to 50 kilometers (Gerdener et al., 2023)

[Global] Over the last two decades, only 26% of [scientific] literature seeks to measure the extent to which society influences the duration and intensity of drought hazards. Fewer scholars (10%) have been retracing the long-term dynamics between society and drought risk (Savelli et al., 2022)

[Global] Meteorological indices are best linked to impact occurrences overall and at long timescales between 15 and 33 months (Sentelles & Franzke, 2022)

[Global] To fully quantify drought legacies, observations of up to 5 and 15 years may be required for grasslands and forests, respectively (Müller & Bahn, 2022)

[North America] The U.S. Drought Monitor uses a 5-category system, labeled Abnormally Dry or D0, (a precursor to drought, not actually drought), Moderate (D1), Severe (D2), Extreme (D3) and Exceptional (D4) Drought. The map is updated weekly (USDM, 2023)

[Asia] In Southeast Asia, nearly 64% of the drought digital maps were produced at a spatial resolution of 1km and above, whereas only 20% of the publications had a spatial resolution of less than 100m (Ha et al., 2022)

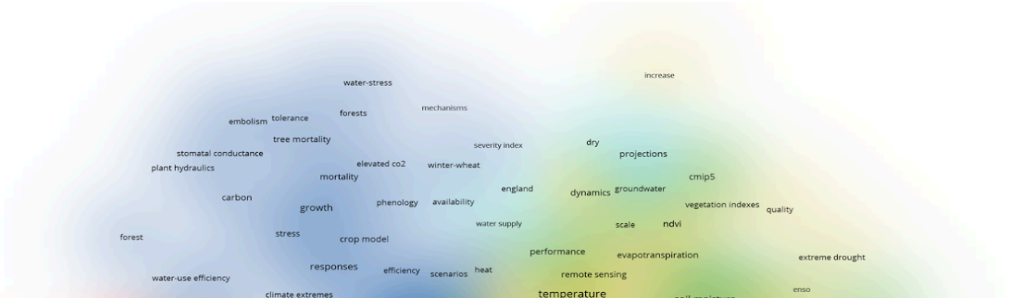

Fig. 3: Cluster density and distribution of science publication on drought

The multiple impacts of drought

[Global] Drought has multiple negative impacts even within a single domain. For example, droughts severely impact ecosystems with homogeneous vegetation, which are most susceptible to drought, especially under long-term drought conditions (Ding et al., 2020). Besides, drought can lead to the migration or even the extinction of entire animal species (Orimoloye et al., 2022)

[Global] The impacts of drought are intensified by their diverse effects across different sectors, including rivers, watercourses, agriculture, electricity production, industry, as well as significant implications for GDP and welfare (IPCC, 2022)

[Global] Drought can jeopardize primary energy production, e.g., when cooling capacities for power plants reduce due to lowered water levels in adjacent water bodies, requiring a reduction of total energy outputs. Hydropower installations can also be impacted when a lack of water reduces their proper operation. For example, Spanish hydropower generation, which accounts for more than 11% of total energy produced in the country, was at very low levels in 2022 (Lauro, 2022)

[Mediterranean Region] The impacts of drought in the Mediterranean region include substantial crop damage (e.g., 70% loss of cereal crops from 2016 to 2018), urban water supply rationing (e.g., restrictions in Avila in 1993), drops in hydropower production (e.g., about 50% drop during the droughts of 2004–2005 and 2011–2013) (Casas et al., 2022)

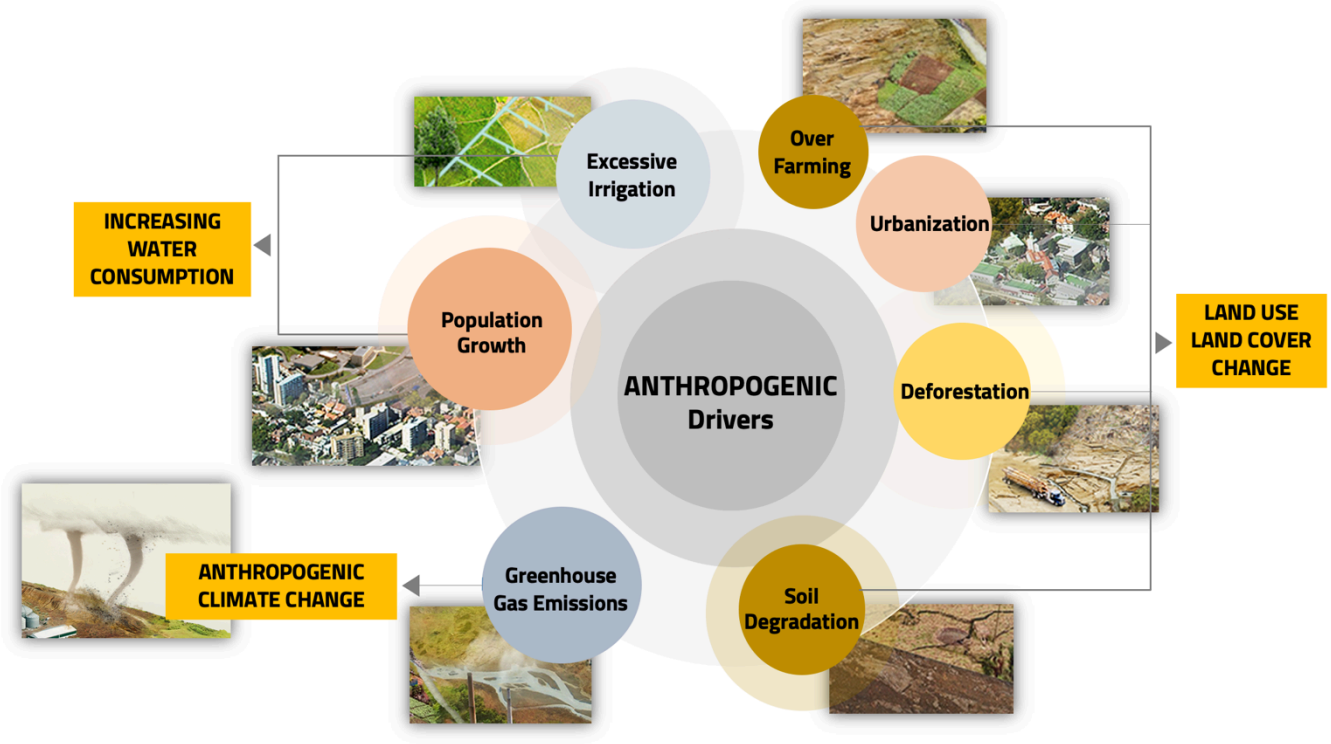

Fig. 4: The drought we made: driving anthropogenic causes

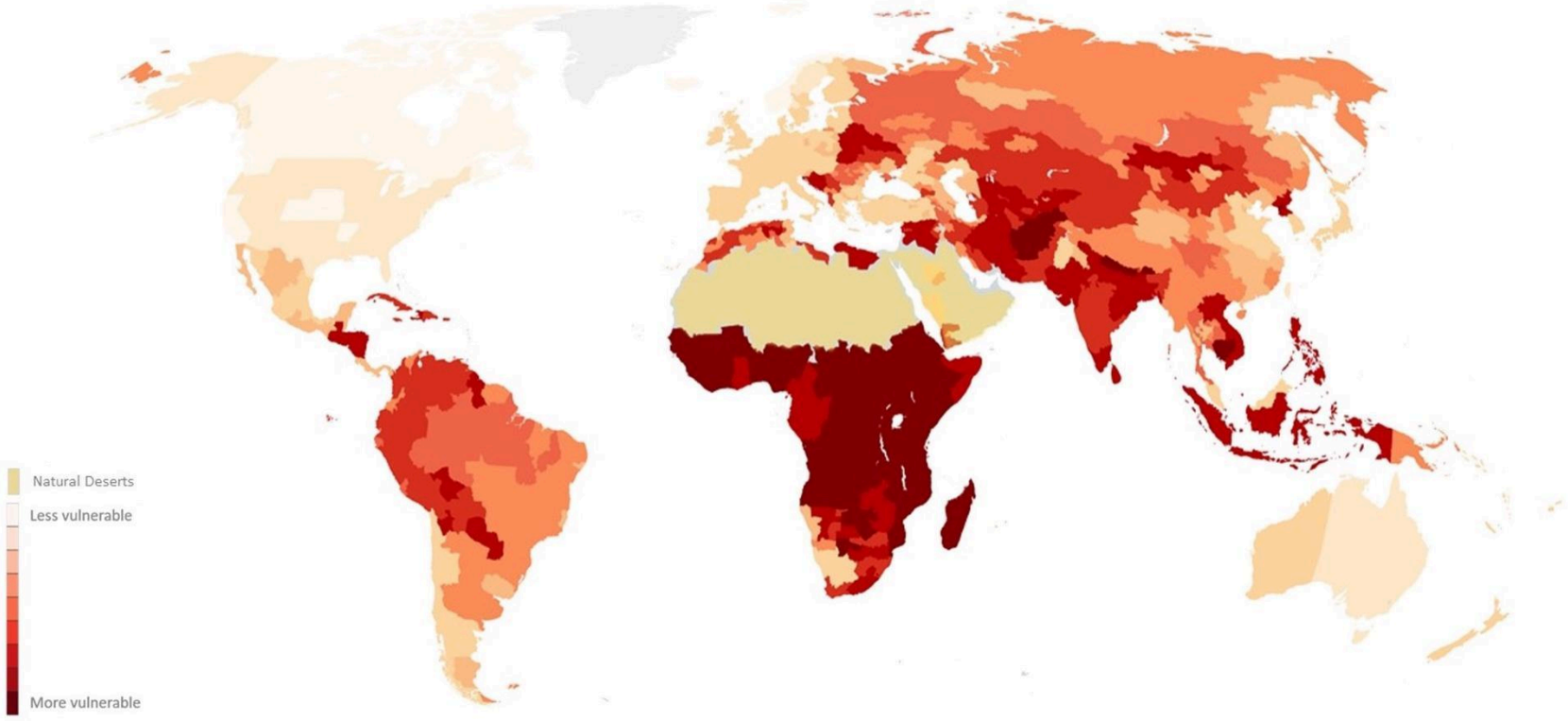

Fig. 5: Global drought vulnerability index (2023)

Cascading effects on ecological systems

[Asia] Glaciers in the High Mountain Asia region have lost significant mass over the past 40 years, and the loss is accelerating. In 2022, exceptionally warm and dry conditions exacerbated the mass loss for most glaciers (WMO, 2023c)

[Africa] A literature review focused on South Africa shows that the negative impacts of drought on ecology include loss of grazing land (33%), loss of water (17%), deterioration of water quality, contamination of drinking water, increase in temperature (11%), and loss of vegetation (11%) (Ruwanza et al., 2022)

[North America] Drought-induced pumpage has precipitated dramatic groundwater-level declines in California's Central Valley over the past 30 years. Long-term rates of groundwater-level decline and water-quality degradation in overdrafted basins accelerated by factors of 2–5 during [periods of] drought (Levy et al., 2021)

[Europe] In Europe, the average annual drought impacts on grasslands was around 20,000km^2 (ca. 5% of grasslands) comparable to the area of Slovenia (EEA, 2023). In relative terms, [forest] losses in the Mediterranean region will double or triple under 3°C warming compared to the current risk (Rossi et al., 2023)

[Europe] A study focusing on the Rhine and Meuse rivers found significant increases in water temperature (on average +1.9°C) and salinity levels (+11%) Increased pharmaceutical concentrations of carbamazepine (on average +10%) and metoprolol (+29%) during periods of drought (Wolff & Van Vliet, 2021)

[Asia] The entire territories of the Islamic Republic of Iran, Iraq, Syrian Arab Republic, Afghanistan and Myanmar; along with the Amu Darya and Syr Darya basins in Central Asia saw below-normal and much-below-normal discharge conditions in 2022. In southern China, the Yangtze River, impacted by drought and prolonged heat, reached record-low water levels affecting almost 5 million people (WMO, 2023a)

Multiple effects on human systems

[Global] Between 2010 and 2020, human mortality from floods, droughts and storms was 15 times higher in highly vulnerable regions, compared to regions with very low vulnerability (IPCC, 2023)

[Global] In high-income countries, extreme droughts reduce growth by a little less than half the impact felt in developing countries (World Bank, 2023)

[Africa] The Horn of Africa faced its worst drought in 40 years, with Ethiopia, Kenya and Somalia particularly hard hit. Five consecutive failures of rainfall seasons have wreaked havoc over large parts of East Africa and contributed to reduced agricultural productivity, food insecurity and high food prices (WMO, 2023b)

[Latin America] Exposed to heatwaves and unpredictable rainfall, the ecosystems and peoples of the Central American Dry Corridor are especially vulnerable to climate change. A 5th year of drought left 1.2 million people in the region needing food aid (UNEP, 2022)

[Asia] About 15–20% of the population in China will face more frequent extreme-to-exceptional (moderate-to-severe) droughts in the 21st century (Yin et al., 2022)

[Asia] Despite floods, large areas in China suffered high temperatures and low rainfall in 2022. The nation's largest river – the Yangtze – and others dropped to levels so low that hydroelectric power generation and river transportation were affected. A report estimated insured losses at $8.4 billion (Planelles et al., 2022)

[Europe] From 2000-2022, the annual impacted area of EU cropland was around 73,000km2 (ca. 5% of total cropland), contributing to crop failures (EEA, 2023)

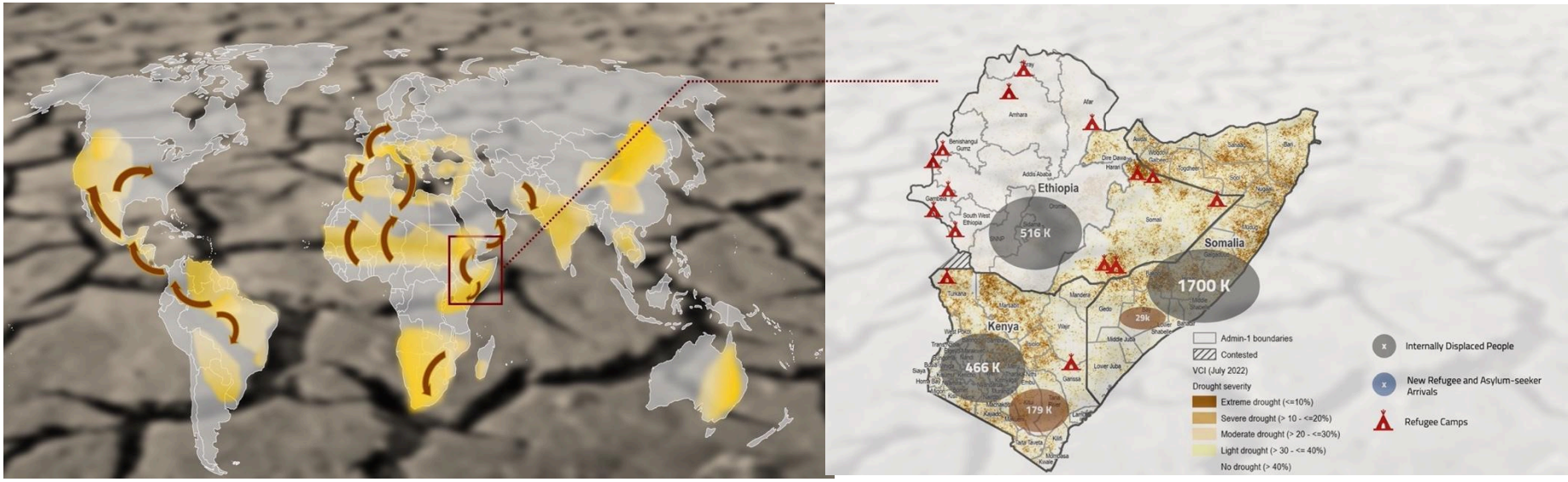

Fig. 6: Overlapping disasters: violent conflicts, migration and drought hotspots

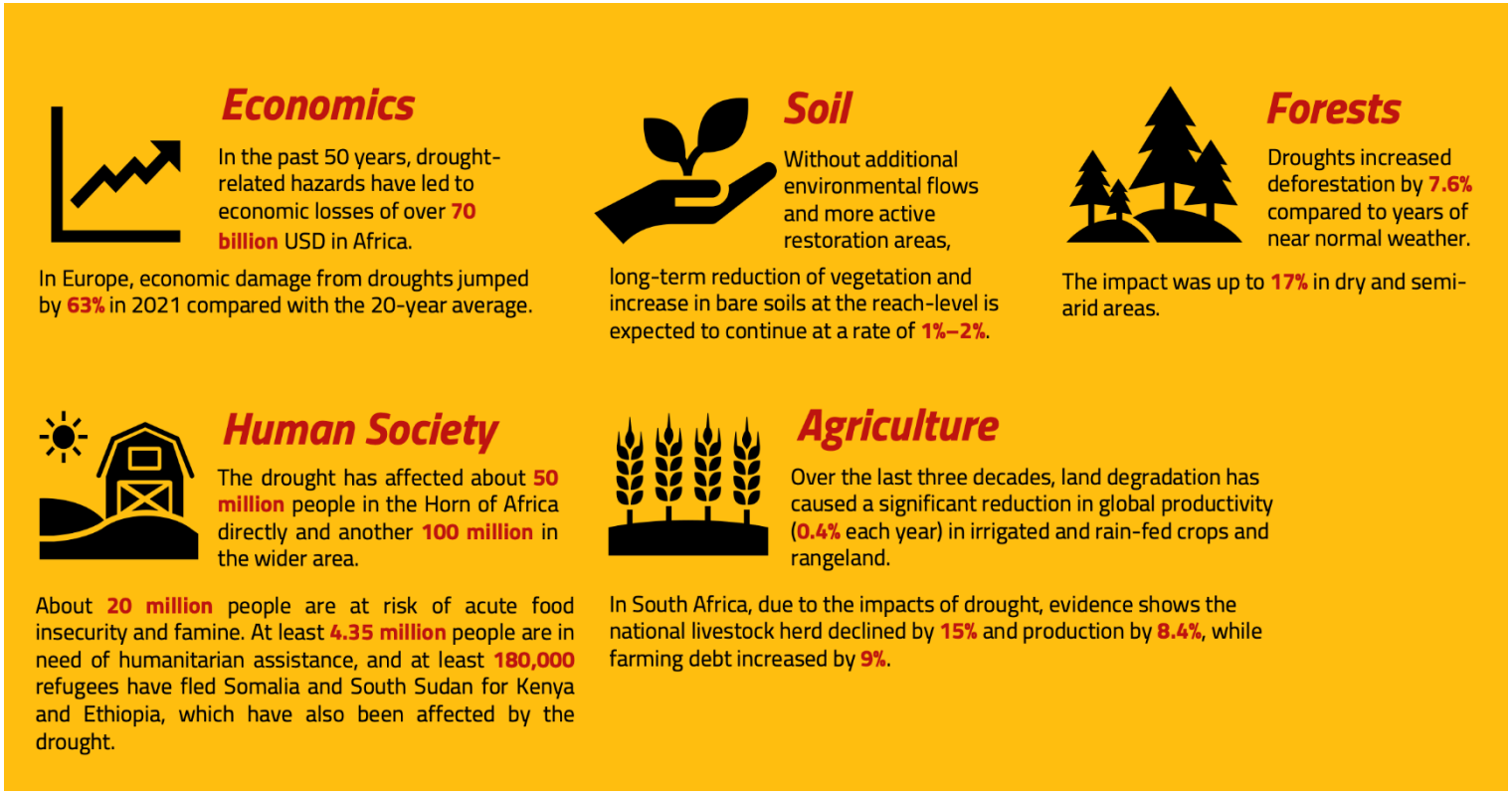
Economics
In the past 50 years, drought-related hazards have led to economic losses of over 70 billion USD in Africa.
In Europe, economic damage from droughts jumped by 63% in 2021 compared with the 20-year average.
Soil
Without additional environmental flows and more active restoration areas, long-term reduction of vegetation and increase in bare soils at the reach-level is expected to continue at a rate of 1%–2%.
Forests
Droughts increased deforestation by 7.6% compared to years of near normal weather.
The impact was up to 17% in dry and semi-arid areas.
Human Society
The drought has affected about 50 million people in the Horn of Africa directly and another 100 million in the wider area.
About 20 million people are at risk of acute food insecurity and famine. At least 4.35 million people are in need of humanitarian assistance, and at least 180,000 refugees have fled Somalia and South Sudan for Kenya and Ethiopia, which have also been affected by the drought.
Agriculture
Over the last three decades, land degradation has caused a significant reduction in global productivity (0.4% each year) in irrigated and rain-fed crops and rangeland.
In South Africa, due to the impacts of drought, evidence shows the national livestock herd declined by 15% and production by 8.4%, while farming debt increased by 9%.

Fig. 7: The multiple impacts of drought

The economics of drought

[Africa] According to the International Disaster Database (EM-DAT), drought occurrences between 1950 and 2021 affected close to half a billion people on the African continent (Ayugi et al., 2022)

[Africa] Africa is particularly under the negative impacts of drought. In the past 50 years, drought-related hazards have led to economic losses of over 70 billion USD on the continent (WMO, 2022)

[Latin America] In Argentina, soybean production in 2023 is expected to be 44% lower than the average of the preceding five years, and the soy harvest is forecasted to be the lowest since 1988/89. The drought has already reduced the estimated Argentinian GDP for 2023 by 3 percentage points (EU Science Hub, 2023)

[Europe] The summer of 2022 brought low water levels to the Rhine that caused severe delays in shipping arrivals and departures. Some vessels were forced to sail with cargoes at just 25% capacity as Europe endured its worst drought in 500 years (World Economic Forum, 2022)

[North America] The Mississippi River runs from Lake Itasca in northern Minnesota for nearly 2,350 miles to the Gulf of Mexico, transporting over 450 million tons of imports, exports and domestic freight every year. But some routes were closed off in October because of low water levels, until dredging operations deepened shipping channels to allow a backlog of over 2,000 barges to reach their destinations. The cost of this was $20 billion in supply chain impacts and economic damage, according to AccuWeather (World Economic Forum, 2022)

[North America] The difference in planning strategies leads to very different annual costs. Planning for short intense droughts and all droughts would cost the city of Santa Barbara over 4 million USD a year, about four times the cost of planning for long mild droughts. Planning for historical and frequent droughts results in about 2.5 million and 3 million USD a year respectively (Zaniolo et al., 2023)

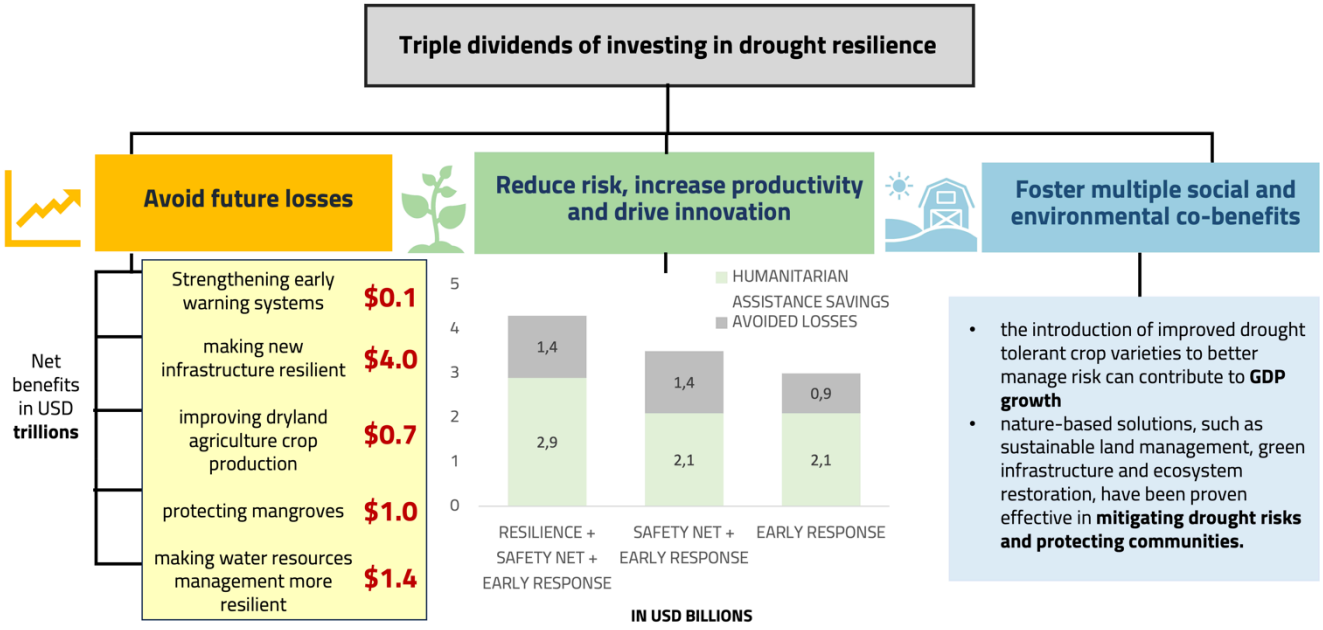

Fig. 8: The economics of drought: the case for proactive investment

POSSIBLE FUTURES

False facts and fake solutions

No need for climate action: A cross-national study shows a considerable spread of misconceptions about climate change in the surveyed countries. 33% of the surveyed population in the US and Australia believe that global warming is a natural phenomenon and is not a direct result of human activity. In Brazil, 30% believe that climate change is not caused mainly by human activity, and 24% believe that the temperature record is unreliable or rigged (Climate Action Against Disinformation and Conscious Advertising Network, 2022) **[Global]**

Time is on our side: Most Net Zero commitments are often centred on a 2050 timeline which is too many years ahead for credible plans to ensure global temperature is kept below 1.5°C. (WECF, 2021) **[Global]**

Big business will save us: More than 90% of corporate-led restoration projects fail to report a single ecological outcome. Further, around 80% of projects do not reveal how much money is invested in restoration, and a third fail to even state the area of habitat they aim to restore (Lancaster University, 2023) **[Global]**

Drought science is sound and solution-oriented: A meta study found that on average only 11% of the literature conduct any form of validation, 10% develop future scenarios of drought risk, and only about 40% of the assessments establish a direct link to drought risk-reduction or adaptation strategies (Hagenlocher et al., 2019) **[Global]**

It rains at our command: Mexico has run at least 5 cloud-seeding programmes. On the basis of those runs, the National Commission for Arid Zones reported that the technology is 98% effective at mitigating the effects of drought and that it has extinguished at least 25 wildfires. But there is no evidence that it will work every time (Valero, 2023) **[Latin America]**

We are the weather-maker: China has used various techniques to manipulate the weather, including massive cloud seeding operations. In 2017, a Chinese military contractor planned to modify Tibetan Plateau weather, potentially shifting 5-10 billion cubic meters of rainfall to northern China, with unknown impacts on local residents and global climate (ETC Group, 2023) **[Asia]**

Innovation and insurances go hand in hand: In the US agricultural sector, climate-driven innovation is observed. However, subsidized crop insurance reduces this response by approximately 2%, potentially impeding long-term climate change adaptation (Miao, 2020) **[North America]**

Only if we understand, will we care. Only if we care, will we help.
Only if we help, shall all be saved.
Jane Goodall

The future is yet to come

[Global] Global heating and changes to how the land is used, especially deforestation, are among the biggest factors responsible for humanity's transgression of this [water-related] planetary boundary. Their combined influence indicates that the planetary boundaries interact and need to be treated as one networked system (Tobian et al., 2022)

[Global] With a warming of 3°C above pre-industrial levels, an estimated 170 million people would experience extreme drought. By limiting the warming to 1.5°C, the population exposed to such conditions would decrease to 120 million (IPCC, 2022)

[Global] Drought is expected to worsen in many regions during the 21st century, even with strong climate change mitigation, and more severely in the absence of this. The global population exposed to extreme-to-exceptional drought is projected to increase from 3% to 8% by 2100 (IPCC, 2022)

[Global] Compound extreme heat and drought will hit 90% of the world's population, potentially widening social inequalities as well as undermining the natural world's ability to reduce CO2 emissions in the atmosphere (Yin et al., 2023)

[Global] Without intervention, the global land area and population facing extreme droughts could more than double from 3% during 1976-2005 period, to 8% by the late 21st century (World Bank, 2023)

The options on the table

[Global] A study shows that sustainable development would reduce population exposure to drought by 70% compared to fossil-fuelled development (Tabari & Willems, 2023)

[Global] Options like ending poverty through reform of the international financial system, such as lifting 3-4 billion people out of poverty and addressing gross inequality by ensuring that the wealthiest 10% take less than 40% of national incomes, can avoid regional societal collapse driven by rising social tensions, food insecurity and environmental degradation (Sandrine Dixson-Decleve et al., 2022)

[Global] Close to 45% of disaster-related losses at a global level in 2020 were insured, a growth from 40% of insured loss over the period of 1980-2018. However, disaster insurance cover remains very low in many developing countries (UNDRR, 2022)

[Global] On average, only 15% of rainwater enters the ground in urban areas while in rural areas 50% of rainwater is absorbed into the ground. Rainwater harvesting provides both urban and rural areas with an efficient option to store rainwater and then reuse it in times of drought (Vyas, 2023)

[Europe] One hundred cities in the EU are supposed to become climate neutral by 2030. But the policy program that they follow focuses too much on technological solutions. Nature-based solutions have the potential to reduce carbon dioxide emissions by up to 25% (Pan et al., 2023)

Fig. 9: The International Drought Resilience Alliance

Anecdotal hope: restoration, recovery and resilience

[Global] The UN Decade on Ecosystem Restoration is helping to deliver on commitments to restore 1 billion hectares of land by 2030. In 2022, the Decade awarded the first 10 World Restoration Flagships, which seek to restore more than 68 million hectares and create nearly 15 million jobs (UNEP, 2023)

[Africa] The establishment and expansion of government social protection systems [at the Horn of Africa] over the last decade has helped improve responses to acute food insecurity (WFP, 2023)

[Africa] A study focusing on Ethiopia found that over a 5-year effective implementation period, gross primary production in treated locations grew by 13.5% on average in areas affected by severe droughts and by 3.1% in areas that did not experience droughts. This suggests important drought-buffering effects [from the restoration] (Constenla-Villoslada et al., 2022)

[Europe] The EU and its countries are working on a nature restoration law, which aims to return nature and ecosystems to good conservation condition. The rules require member states to put in place effective restoration measures to cover at least 20% of the EU's land and sea areas by 2030. By 2050, measures should be in place for all ecosystems in need of restoration (European Council, 2023)

[Africa] The African Forest Landscape Restoration Initiative stated that the first USD 2 billion investment in local African organizations, businesses and government-led projects could later initiate an investment of USD 15 billion, which could spark the restoration of 20 million hectares of land by 2026. This in turn could generate USD 135 billion in benefits to around 40 million people (Hess, 2021)

[Africa] Every US dollar invested into land restoration [in the Great Green Wall] yields on average US$1.2 under the base scenario, ranging from US$1.1 to US$4.4 across the scenarios. At most, ten years are needed for land restoration activities to break even from the social perspective, accounting for both market-priced and non-market ecosystem benefits. (Mirzabaev et al., 2022)

[Asia] The Landscape Partnership Asia announced **[in 2022]** the restoration of a minimum of 10 million hectares by 2030. The national dryland restoration efforts are substantially enhanced with large areas brought under integrated dryland and drought management. (World Agroforestry, 2022)

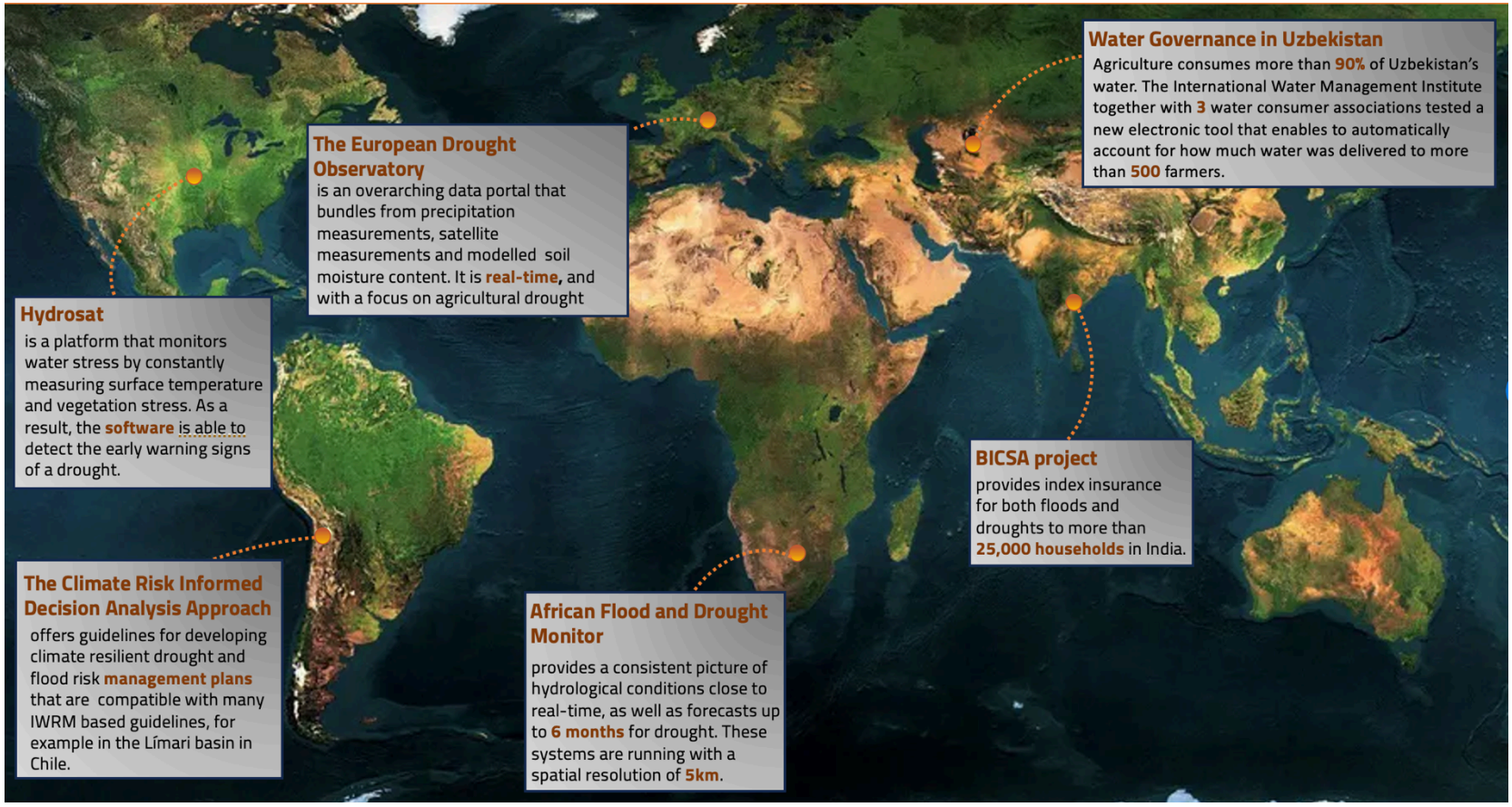

Fig. 10: Global map of scalable best practices

The scale and commitment we need

[Global] Recognizing the need for decisive action, a coalition of like-minded nations led by the governments of Senegal and Spain established the International Drought Resilience Alliance (IDRA). This collaborative platform, launched at the UNFCCC COP27 Leaders' Summit in 2022, also convenes intergovernmental organizations, multilateral development banks, financial institutions, non-governmental and private sector entities, civil society organizations and indigenous groups (UNCCD, 2022)

[Global] The threat of a mass extinction of plant and animal species led 195 nations to agree to protect and restore at least 30% of the Earth's land and water by 2030 (CBD, 2022)

[Global] Substituting half of animal products, such as pork, chicken, beef and milk, consumed globally with more sustainable alternatives could "almost fully halt" the conversion of forests and natural land for agriculture, according to new research (Carbon Brief, 2023)

[Global] The United Nations Secretary-General announced that the Early Warning for All initiative aims at covering the whole world with early warning systems by 2027 (ITU Hub, 2023)

[North America] Micro-irrigation, also known as drip irrigation, reduces water waste by delivering water directly to the root of the plant. Though costly, micro-irrigation systems use about 20 to 50% less water than conventional sprinkler systems (STEM Writer, 2022)

[Asia] The water level in the Aral Sea has increased by nearly 1.5 billion cubic meters, rising to 95 centimeters for the first time in many years. The Kyzylorda Region has restored soil moisture almost from scratch. (Sakenova, 2023)

[Africa] The Volta basin Flood and Drought management project aims at providing the first large-scale and transboundary implementation of Integrated Flood and Drought Management strategies through the complete chain of an End-to-End Early Warning System for Flood Forecasting and Drought Prediction. This includes six riparian countries (Benin, Burkina Faso, Cote d'Ivoire, Ghana, Mali and Togo). (Deltares, 2023)

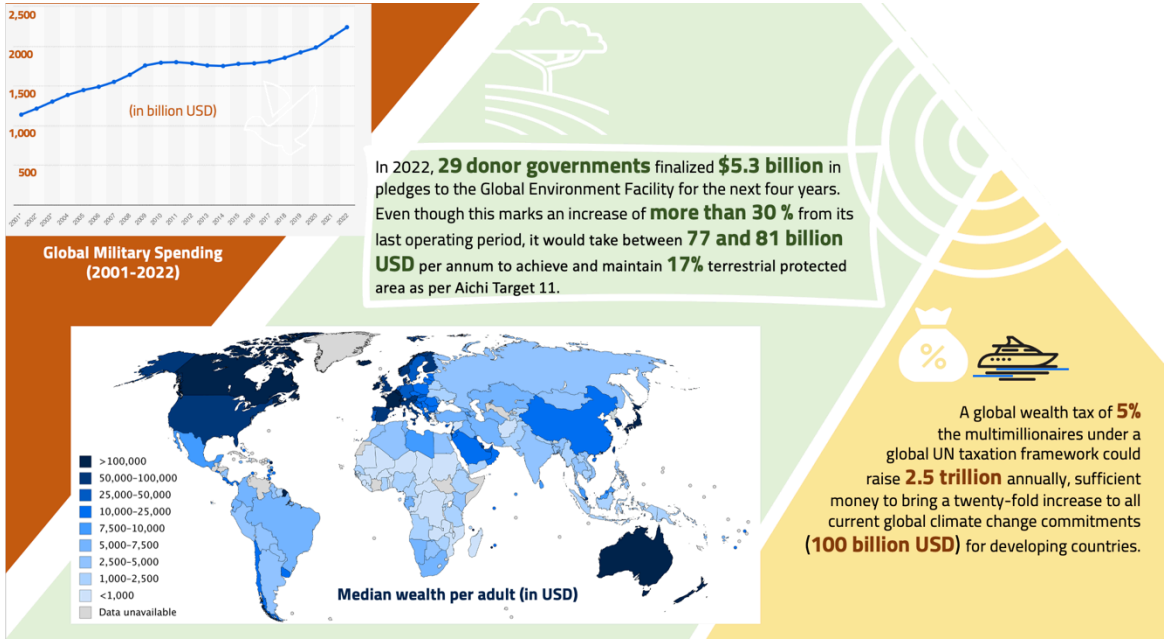

Fig. 11: Global paradoxes: wealth disparities, military versus environmental spendings

Epilogue

All facts and figures point to one direction: the need to move forward to a more drought-resilient future is immanent and without alternative. We are facing an unprecedented emergency on a planetary scale, where the massive impacts of human-induced droughts are only starting to unfold.

Several countries are already experiencing climate-change-induced famine; forced migration surges globally; violent water conflicts are on the rise; the ecological base that enables all life on earth is eroding more quickly than at any time in known human history.

We have created a world where no other hazard claims more lives, creates more economic loss and affects more sectors of societies than drought. Transformational change is needed. We must depart from the false promises of "development" that leave billions behind in poverty and destroy the planet's ecological systems at an unprecedented scale and speed.

Nothing in nature can survive unlimited growth. Nothing in nature exists independently. Everything is interconnected and we are starting to realize this only now. We are not separated from nature, but are an integral part of this fragile web that evolved over millennia.

We have no alternative but to move forward in a way that respects the planet's boundaries and the interdependencies of all forms of life. We need to adopt proactive measures that are to be taken by nations to curtail the spells of drought. The less space the developed human world occupies, the more natural hydrological cycles remain intact. Restoring, rebuilding and revitalizing all those landscapes that we have degraded and destroyed is the imperative of our time. Urban intensification, active family planning, and curbing rapid population growth are prerequisites for societal development that respects planetary boundaries. One crucial factor in this is a dietary shift toward more plant-based nutrition that does not rely on industrial animal farming and is much less resource intensive, in regard to both land or water. Furthermore, it is important to cut food

waste, to buy from local markets and to swop cloth instead of always buying new.

It is possible to reach a stage where the risks are manageable and where human activities do not further amplify drought, but actively work towards building a future worth living in.

Fig. 12: Landscape overview: a degraded watershed … versus a drought resilient watershed

You didn't come into this world. You came out of it, like a wave from the ocean.

Allan Watts

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fig. 1: Countries affected by drought (2022-2023)

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fig. 2: List of countries declaring drought emergencies (2022-2023)

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fig. 3: Cluster density and distribution of science publications on drought

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fig. 4: The droughts we made: driving anthropogenic causes

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fig. 5: Global drought vulnerability index (2023)

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fig. 6: Overlapping disasters: violent conflicts, forced migration and drought hotspots
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Fig. 7: The multiple impacts of drought
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fig. 8: The economics of drought: the case for proactive investment
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fig. 9: The four pillars of holistic drought engagement (IDRA)
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fig. 10: Global map of scalable best practices
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fig. 11: Global paradoxes: wealth disparities, military vs. environmental spendings
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fig. 12: Landscape overview: a degraded watershed versus a drought resilient watershed
Design: SEE-International & One Big Robot

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Drought specific databases and portals

The United Nations Convention to Combat Desertification (UNCCD) – Drought Toolbox:

knowledge.unccd.int/drought-toolbox

The UNCCD developed the drought toolbox for providing drought stakeholders with easy access to resources to support action on drought preparedness to boost the resilience of people and ecosystems.

Drought Calculator:

www.nrcs.usda.gov/wps/portal/nrcs/detail/nd/technical/landuse/?cid=nrcs141p2_001670

The U.S. Department of Agriculture developed the drought calculator to assist ranchers and rangeland managers in assessing the impacts of drought on healthy rangelands and make informed decisions for drought preparedness strategies.

The International Disaster Database:

www.emdat.be/database

The Centre for Research on the Epidemiology of Disasters – CRED, Université Catholique de Louvain provides information on the human impact of disasters - such as the number of people killed, injured, or affected for vulnerability assessment and rational decision-making in disaster situations

United Nations Office for Disaster Risk Reduction (UNDDR) Preventionweb – Drought Solutions:

www.preventionweb.net/collections/drought-solutions

The UNDDR collected stories and research regarding different drainage solutions

EDO – European Drought Observatory/GDO – Global Drought Observatory:

edo.jrc.ec.europa.eu/gdo/php/index.php?id=2101

The EDO/GDO pages contain drought-relevant information such as maps of indicators derived from different data sources (e.g., precipitation measurements, satellite measurements, modeled soil moisture content).

The FAO Drought Portal:

www.fao.org/land-water/water/drought/drought-portal/en/

The FAO Drought Portal collates tools, methodologies, publications, and best practices from different disciplines to support informed decision-making and promote integrated drought management in agriculture.

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