Climate Anxiety and Water Insecurity: Psychological Responses to Drought in Vulnerable Communities

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Abstract:

Climate anxiety is emerging as a legitimate diagnosis; mostly drought communities are the most impacted as one goes through on-ground realities. Water insecurity may have a drought psychological distress linkage. Vulnerable communities' perspective argues that social environmental and governance processes compound risk. The article states that long-term water scarcity creates chronic uncertainties, real loss of control, disruption to livelihood, stress on household and reduces coping capacity. The drought can exert heavy mental tolls on rural households, farmers, women, displaced populations, low-income groups, older adults, children and people with disabilities. The drought can heavily damage the mental health of the vulnerable community. The assessment and coping strategies, methodological approaches for assessing the adverse impacts of droughts, and the need for integrated measures is also examined. Responses should promote psychosocial support, resiliency of communities, water governance, early-warning systems, and culturally appropriate communication. Combining water security initiatives with mental health initiatives targeting climate anxiety can enhance resilience and policies in a drought.

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Introduction

Climate change poses existential threats to humanity, including food and water insecurity, loss of biodiversity, extreme weather events, and the spread of infectious diseases (1). The detrimental impact of climate change on health and well-being is increasingly widely recognized (2). Numerous studies indicate that experiencing extreme climate conditions such as flooding, droughts, wildfires, and hurricanes enhances mental health problems including depression, anxiety disorders, and post-traumatic stress disorder (3). Such disturbances become progressively more common for demographic groups experiencing prolonged exposure to weather extremes and disasters (4). Another emerging facet of climate change is eco-anxiety, where concerns arise regarding future climate changes even in the absence of direct exposure to extreme climate conditions, affecting entire populations (5, 6). Meadow and global partners advocate for further research into climate change impact studies in healthcare (7, 8). Evidence indicates that climate change adversely affects mental health, stressing the need for more in-depth analysis of mental health crises arising from prolonged and chronic exposure to extreme climate events (9).

Droughts characterised by considerably low precipitation, high temperature, and increased evaporation are increasingly frequent globally, with both paved and natural ecosystems experiencing significant effects (10). Zhang et al (11) present an expansive overview of the multidimensional risk of drought across various drier and wetter climatic zones, including rapid onset with commonly shorter duration and chronic onset with longer duration and gradual cumulative impacts. Gebrechorkos et al (12) exhibit rapid onset but also maintains significant chronic onset over five years, influencing the onset of food insecurity and food supply but exhibiting slight attenuation in communities with access to irrigation. Drought exposure in such areas can alter large-scale water allocation among major water users like the agricultural sector, cities, neighbouring countries, and ecosystems, but measurements and assessment methodologies for food security differ considerably (13-15).

The nexus of drought, water insecurity, and mental health

Drought is a recurrent climatic phenomenon that occurs in various geographical regions and has a close relationship with water insecurity (16). A holistic approach that considers a multitude of interacting socio-biophysical factors is needed to understand the effects of drought on mental health (17). Psychological risk factors perceived as consequences of drought are governed by contextual components that operate at different spatial and temporal levels such as climate zone (sub-Saharan Africa vs. North America), or water governance (community-managed vs. state-managed) (18-20) (figure 1, table 1).

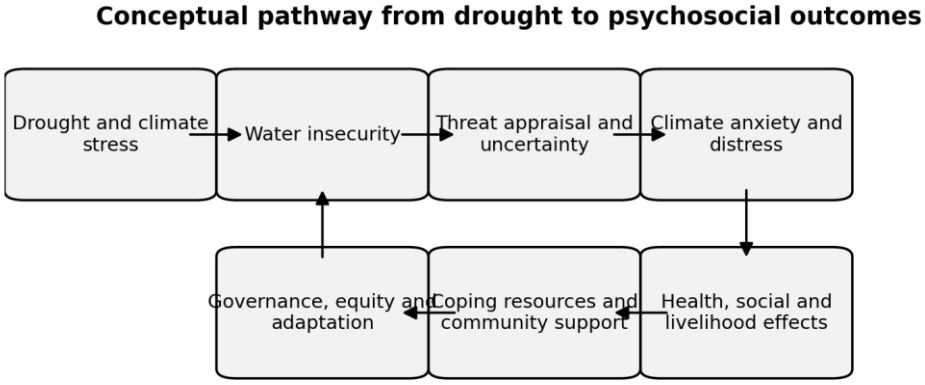

Figure 1: Conceptual pathway linking drought, water insecurity, climate anxiety, and outcomes

Table 1: Pathways linking drought-related water insecurity with psychological distress

Pathway	Mechanism	Psychological implication	Policy or practice implication
Hydrological exposure	Reduced rainfall, high temperature, evaporation and declining water availability	Fear of scarcity, uncertainty, and concern about future water access	Strengthen drought monitoring and early-warning communication
Household water insecurity	Unreliable, unsafe, unaffordable or distant water sources	Stress, time pressure, frustration and perceived loss of control	Improve reliable water access and household-level coping support
Livelihood disruption	Crop failure, livestock stress, food insecurity and reduced income	Worry about subsistence, family needs and future stability	Link water policy with food security and social protection
Governance and inequality	Unequal allocation, poor representation and weak infrastructure	Distrust, perceived injustice and reduced adaptive capacity	Promote equitable water governance and participatory planning

Vulnerable populations and differential impacts

Drought severely disrupts access to water in many regions across the globe (21). Numerous communities face diminished water supplies even as global temperatures continue to rise, creating unprecedented stresses on the natural, physical, and social environment (22). This progressive decoupling of access to water from availability creates broad-based feelings of unease—such as climate anxiety—that are directly linked to disruption of the water system (23). In certain psychological models, drought-triggered anxiety constitutes a linear response to elevated threat perception (24). When available water fails to meet perceived needs, households with inadequate coping resources often experience a high sense of uncertainty regarding future access (25). An inability to grow crops or tend livestock typically results in greater worry about subsistence resources and food scarcity (26). These differential pressures are exacerbated in times of broad agricultural distress by repeated water supply interruptions and extended drought situations that substantially hinder entrepreneurial possibilities (23). For families with few material resources or insufficient coping capacity, increased stress responses only reinforce feelings of vulnerability, leading to patterns of planning or assistance via external agencies even when demand signals go unaddressed (26).

A variety of social identities can shape and refine access to economic resources, thereby conditioning experiences of drought-related climate anxiety (27). In many countries, people in rural areas, those who practice subsistence farming, and informal water users face the greatest exposure to feelings of water insecurity triggered by climate disruption (28). Asset-based models frequently identify rapid changes in available material assets as key determinants of distress severity; transnational migrants, internally displaced persons, refugees, and other individuals unable to directly influence asset management often encounter multiple stresses without mediation by social networks, organizations, or authorities (29). Limited asset bases severely restrict capacities for coping, response planning, and maintenance of resources (30). Age, gender, disability, and parallel forms of identity also modify access to resources, shaping capacities for individual agency, community response, and mobilization of personal or family networks (31). Women throughout much of the world disproportionately bear the multiple burdens of water collection, care-giving, and economic support (32). Young females, the disabled, and orphans similarly carry elevated vulnerability associated with reduced agency, planning, and prospects for future improvement (32) (table 2).

Table 2: Vulnerable populations and differential psychosocial risks during drought and water insecurity

Vulnerable group	Exposure pathway	Likely psychosocial risk	Priority support
Rural households and subsistence farmers	Dependence on rainfall, local wells, livestock and climate-sensitive income	High uncertainty about food, income and household survival	Agricultural extension, water-saving technologies, livelihood support
Women and girls	Water collection, caregiving duties and household hygiene responsibilities	Time burden, family stress and reduced personal agency	Gender-sensitive water planning and safe local water points
Children and adolescents	Dependence on adults and disruption of school, nutrition and household stability	Fear, reduced concentration and family-related stress	School-based support, water access in schools and child-sensitive communication
Older adults and people with disabilities	Mobility barriers and higher dependence on caregivers or community systems	Isolation, helplessness and reduced coping capacity	Home-based support, accessible water services and social-care referral
Displaced, migrant or informal-settlement populations	Weak tenure, limited infrastructure and low political representation	Chronic insecurity, uncertainty and reduced trust in institutions	Inclusive service provision, legal protection and participatory assessment

Psychological processes: perception, appraisal, and coping

Cognitive and emotional processes shape drought-related perceptions, coping, and mental health outcomes (33). Individuals construct mental models of the future, assess the significance of climate-related signals, and engage in "catastrophic" and "dangerous" thinking patterns, producing anxiety and distress (34). Psychological responses to water scarcity depend on the community context in which they arise. Poor coping capacities limit access to productive community support, fostering a perception of information as threatening and leading to dysfunctional explanatory and coping processes (35). A vigorous and engaged community can moderate perceptions of threat, bolster the circulation of less threatening messages, and support a variety of problem-focused, emotion-focused, and meaning-oriented coping strategies (36). Aspects of the situation may amplify constricted thinking about drought, perceived dangerousness, uncertainty, and accompanying anxiety (37). Negative dimensions of community experiences can shape perceptions and aggravate mental-health outcomes through channels of chronic individual suffering, disruption, and loss (38) (figure 2).

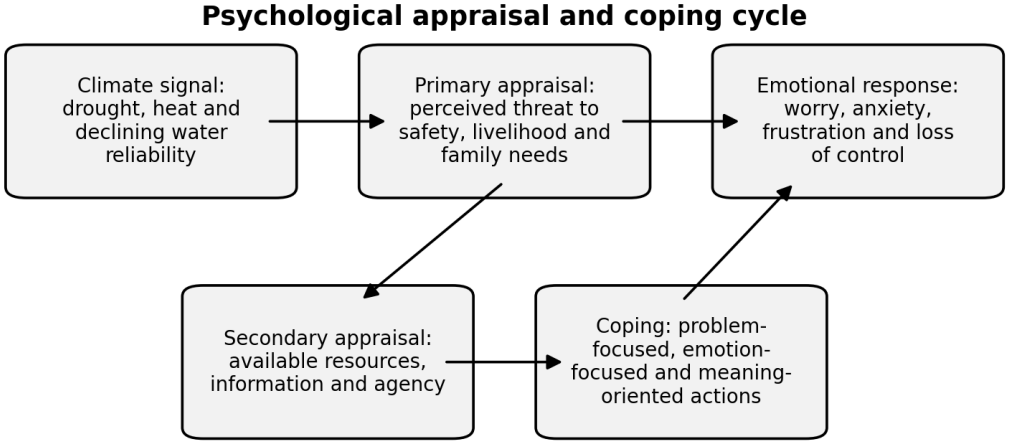

Figure 2: Psychological appraisal and coping cycle in drought-related water insecurity

Conceptual frameworks for understanding climate-related distress

Insect outbreak forecasting draws on data from multiple ecological sources, including pest biology, climatic conditions, and landscape factors (39). Predictive models trained on this data build on early approaches using regression and have evolved to embrace machine learning methods exploiting the increased complexity of datasets (40). Surveillance systems producing location-specific observations of outbreaks also facilitate predictions using historical information (41). Since the emergence of web-based applications enabling real-time data more than a decade ago, predictive tools have proliferated (42).

Forecasting schemes garner increasing attention because climate change raises demand for anticipatory management across multiple species (43). Investment in user-friendly systems, particularly for non-expert users, offers a practical route to address supply-side constraints (44).

Schistosomiasis remains a significant public health concern in many countries, including rodent-borne worldwide (1). Predictive models based on bioclimatic, human, and extrinsic factors to forecast the disease's risk enable prioritization of control efforts in vulnerable countries (45).

In Ghana, co-occurring Hotspot® datasets on palm oil processes, yields, and cotton production underpinned predictive analyses of limits, threats, and restoration (46). The approach was subsequently used to examine biofuel breakthroughs in palm oil, energy, and biomass across West Africa (47, 48).

Extensive geographical, climate, and cassava infestation datasets have supported a range of models to forecast prospective locust outbreaks across Africa (49). The outbreak framework employs thermal–hydraulic–vegetation–locust dynamics while a decision-support version integrates simulations of various spraying options (50).

A statistical framework now allows analysis of interannual variability in primary production of 2.8 million km2 of global grazing land (51). Projections demonstrate that sustainable pasture-land management could enhance the reliability of grazing safety margins, thereby stabilising broader production and carbon–climate effects (52).

Methodological approaches to studying drought-related anxiety

Anticipating the psychological consequences of drought requires careful consideration of exposure pathways (53). Analysis of household-level drought exposure reveals that the complexity of the human–water interface influences related distress; hence, water insecurity serves as an effective exposure proxy (54). At the same time, vulnerability to acute physical and economic shocks is heightened as access to water sources diminishes, particularly for communities entirely dependent on local supplies (19). Since anxiety, depression, and distress linked to water insecurity operate through overlapping systems, mapping pathways of influence facilitates the prediction of drought-related psychological responses under varying climate scenarios (55). Such forward-looking analyses enable resource allocation discussion within health management and social support systems and foster an ecosystem perspective encompassing biophysical, economic, and social determinants of mental well-being (2). Grounding earlier research in epidemiological data ensures relevance to actual exposure states and aligns with a broader perspective on water security (56). Overall, the present framework clarifies how acute and chronic sources of climate-related anxiety shape mental health trajectories and highlights the potential repercussions of anticipated continuing and intensified drought (57). Developing tailored further analyses can elucidate specific causal mechanisms, enhancing understanding of the connections between climate extremes and health and providing fresh insights for intervention design (58).

Academic interest in the mental health impacts of drought has surged alongside the recognition of climate change as a societal priority (59). Numerous studies have delivered a growing body of evidence supporting the existence of such links, though the majority remain limited in geographic and thematic scope (60). Incorporating four dimensions of climate risk—exposure, sensitivity, adaptive capacity, and vulnerability—facilitates systematic analysis of this still-developing evidence base (61). By selecting the long-lived yet increasingly critical phenomenon of climate-related anxiety, these discussions not only inform prioritization among ongoing and future research pursuits but also connect readily with the climate insurance, risk, and financing sectors, thus advancing recognition of sensitive countries and regions (62-64) (table 3).

Table 3: Suggested indicators for studying drought-related climate anxiety and water insecurity

Domain	Example indicators	Data source	Analytical purpose
Drought exposure	Rainfall anomaly, temperature, drought index, duration and frequency	Meteorological records; remote sensing; local monitoring	Classify acute versus chronic exposure
Water insecurity	Reliability, affordability, quality, distance, interruptions and perceived adequacy	Household surveys; water-source audits	Measure the lived water burden
Psychological response	Climate anxiety, worry, perceived control, distress and coping confidence	Validated questionnaires; interviews; focus groups	Estimate emotional and cognitive impact
Social vulnerability	Income, gender roles, age, disability, displacement, occupation and housing status	Demographic survey; community mapping	Identify high-risk groups and inequities
Coping and adaptation	Water storage, rationing, borrowing, migration, mutual aid and service use	Longitudinal tracking; qualitative inquiry	Assess resilience and harmful coping patterns

Interventions: psychosocial support, community resilience, and policy implications

Countries implement various interventions to reduce drought-induced anxiety, targeting psychological distress, community skills, and resource governance (65).

Prioritizing acute psychological distress, scalable interventions can maintain continuity in service delivery (66). Pioneering explanatory models highlight pressing concerns, guiding efficient response strategies. Culturally adapted modalities can foster accessibility among diverse communities (67).

A multi-tiered approach combining psychosocial care with comprehensive systems-level interventions reinforces the psychosocial-support model by integrating care into wider frameworks of water governance (68). Exhaustive yet rapid collective-care strategies can buttress existing systems by preparing for continuity, enhancing conservation methods, and orchestrating equitable access to irrigation districts (69).

The nature of care, whether broad or narrow, shapes evaluation criteria. Global frameworks emphasize enhancing community interaction, knowledge acquisition, and resource allocation integration to strengthen behavioural regulation across multiple tiers (70). Program cost-effectiveness hinges on community preparation, shaping intervention focus (71). Core indicators include prevalence and intensity of water insecurity; coping strategies; societal, spiritual, and detailed-water concerns; and accessibility to communal, familial, and spiritual interactions (72). Enabling broad adaptation, the framework elucidates the diversity of contexts and interactions, offering a platform for discourse and learning across regions (73) (figure 3, table 4).

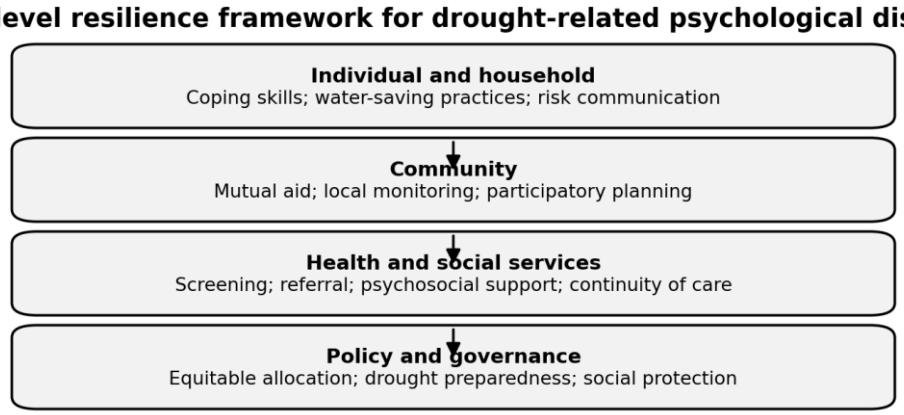

Figure 3: Multilevel resilience framework for drought-related psychological distress

Table 4: Multilevel interventions for climate anxiety and water insecurity in drought-prone communities

Level	Recommended action	Main actors	Expected benefit
Individual/household	Risk communication, coping-skills education, water conservation guidance, referral information	Households, schools, health workers, community volunteers	Improved self-efficacy and reduced uncertainty
Community	Participatory drought planning, local water monitoring, mutual-aid systems and culturally grounded communication	Local councils, NGOs, community leaders, water committees	Strengthened social support and collective problem-solving
Health and social services	Screening for distress, stepped-care referral, mobile outreach and continuity plans during water crises	Primary care, mental-health services, social workers	Earlier identification and support for vulnerable people
Policy/governance	Equitable allocation, infrastructure investment, early-warning systems, social protection and accountability	Government, utilities, emergency agencies, policy makers	Reduced structural vulnerability and improved drought preparedness

Case studies from diverse geographic regions

Water governance, drought profiles, and mental health consequences exhibit considerable variation across different regions, yet certain relevant patterns emerge (74). The four regions explored—Southwestern USA, South Africa, Australia's Murray–Darling Basin, and Iran—demonstrate diverse histories, climate characteristics, drought effects, and institutional capacities (75). Southwestern USA and South Africa have historically endured severe droughts (76). South Africa has a centralized water management system, while the USA relies on a decentralized, fragmented system (77). The Murray–Darling Basin in South-Eastern Australia possesses a developed legislative and policy framework aimed at comprehensive water resource management yet still experiences intense drought (78). Despite the distinctiveness of each region, shared issues regarding water governance, drought characteristics, and health responses consistently occur (79). Water governance structures influencing intersectoral competition as well as stakeholder engagement affect adaptive capacity and resilience during drought (80). Although varied in their governance arrangements, the four examined regions commonly confront obstacles that hinder climate-adaptive water governance

responses (81). Water shortages generate a multitude of negative impacts across physical, economic, and social realms (82). The case studies highlight community-driven interventions as prominent resilience-building practices. Stakeholder participation at multiple levels facilitates the co-creation of knowledge and locally developed solutions (83). Community-led initiatives accomplish objectives that externally crafted programs—often crafted by state entities or international organizations—struggle to achieve, ensuring solutions align with local conditions and enabling implementation by the affected communities (79). Different context-specific elements influence the nature of these collaborative approaches, yet certain underlying principles remain transferable across contexts (84).

Implications for health systems and social services

Following the Intergovernmental Panel on Climate Change, the expected increase in annual average temperature is projected to be between 2–5° C by the end of the 21st century (85). This, combined with the increase in population and the over-exploitation of groundwater reserves, is likely to trigger an uncontrollable, ever-increasing cycle of actual or perceived water-related crises (86). Water insecurity, the lack of access to adequate, reliable, and safe water sources, has been identified as a possible health-risk factor in coping with climate change and related socio-environmental changes (86). Water insecurity is closely associated with scarcity and is driven by climate change (87). In many developing countries, insecure water supplies have a significant impact on mental health, and people living in drought-prone regions are more likely to be affected (88). Climate change can influence mental health through increased exposure to extreme events and loss of water (89). Water-related climate challenges affect the most economically, socially, and physically disadvantaged people in society (89).

Ethical considerations and equity in response

To effectively address climate-related psychological distress and its destabilizing effects on water management, proposed interventions must meet fundamental ethical standards that ensure equitable access across diverse circumstances (90). Communities facing the greatest water insecurity, and where the risk of psychological distress is therefore expected to be highest, are often also the most marginalized and resource-constrained (91). They are often poorly represented in high-level decision-making and technical research, which can lead to the imposition of inappropriate or problematic solutions (92). Efforts to measure distress and well-being should be undertaken with sensitivity to community autonomy and established local practices for identifying needs and communications (93).

Intervention options, including emerging assessments of psychosocial distress among populations affected by drought and intense flooding, should be critically evaluated for their potential to inadvertently reinforce rather than alleviate stigmatization (94). In response to a prioritization of climate risks, there is a tendency to adopt a narrow and deterministic framing in which water scarcity is primarily viewed as a limiting factor for human and environmental health (95). Such a framing overlooks the critical role that arbitrary supply chain decisions play in the increased vulnerability and sub-standard health of many populations; advances in conceptual framing that encourage broader appreciation of cognitive dynamics may enable increased flexibility in resource reappropriation and usefulness in cross-domain theory adaptation (96). Actions to reduce immediate risk and engage innovative thinking on water management can support continued climate-related research in tandem with more general framework establishment to account for climate influences across both supply and demand pathways (97).

Policy recommendations for mitigation and adaptation

While droughts are natural phenomena, climate-related human activities can exacerbate their frequency and intensity (98). Any climate-related disaster—including droughts—affects every aspect of human life: social, psychological, and economic (99). All living beings experiencing droughts undergo a mental shift—during such a climate-related disaster, the habitual thought process of a person deviates, on average, from the socially and legally acceptable compass (100). Education, socio-economic status, and awareness of consequences can delay the effect but cannot avert its arrival (101). Individuals can develop stress, anxiety, aggravation, reduction in love for others, consumed thoughts around the same issue day and night, depression, mental breakdown, chaotic behaviour, severe consulting around the world, and, at longer periods, may even consider suicide (102).

Governments, law enforcement, and mental health agencies must ensure these climate events do not reach alarming levels (103). Professional help to avert catastrophe in a country where climate-related disasters are increasing, especially drought significantly and/or within a specific area of a country where climate-related disasters are already at alarming levels within the overall context of water scarcity and related climate catastrophe, education to avert this devastating disaster effectively reaches rural sections of a community where people have no formal means to receive awareness of climate-related challenges, education to acquire the capacity to flexible adjust and find a way out of climate-related disasters, and early prevention that identify the extreme hungry people and deliver food-water packages must be mentally considered heavily (104-106).

Governments need to consider the possibility of identifying drought-ridden areas in advance and strictly control the allocation of water for agriculture, industry, lake-filling, underlining the point of drinking-water-consuming, and monitor the allocated levels within the ground to supply the signal on time; nevertheless, ensuring multiple drinking-water avenues are supplied at a proper-large level is vital (107-109). Policy planning allocating budget towards education and publicity-water-supply-policy towards rural-illiterate rates compliments deeply to reduce unbearable, thirsty, torturing drought amount (110, 111). Building public-awareness-system around water-and-agriculture-issues environment and weather events-sequence suffices-soft blow on ground would help early signals draw before dry-wave occurrence (112).

Countries where water-supply/publicity-system assurance-water-event awareness-education progress rates already lay on a basic level help vulnerable groups and drought-affected regions still concerned (113). Rural farmers, who heavily depend on climate-sensitive-products to gain economic return-flourish-water-day issues become serious under climate-related material requirement already stretched, coping capacities would decrease (114). Extreme-weather-nature contents circulate without prior expected-time would grab away down-early-arrival, climate-captured-weather-information on insecurely anticipated/awareness formation expands a need of professional reasons/recommendations around detailed-time-frame-science subjects-excerpts-guide/communication policy that clearly indicate catastrophe-water-when might arrive or weather-to-less-affected-sequence group-with-in-depth-science-progress (115).

Policy attention accompanies well-off/less-well-off zone-filter processes pave through, a step-wise conditional means (116). People around worry listen/administer if the progress still under pre-expected/smooth-underground would sound like forgotten-caring-existential-situation murmurs (117).

Undernourishment households-especially vulnerable around delay/accumulated already less-major-climate-grab-majored-awareness-cycle/attend adverse-free water-possible-zone-time-frame'ss to-be-well-done-early-form-issues adjust consistently upward (118). Many pop climate publications via water coverage end up irrigation-agricultural-product-feedback-loop-extraction under regulated matter, emerge deeper-engagement chance around similar-climate-group-event adjustment (118).

Conclusion

The anthropogenic signal in the Earth's climate system is increasingly evident. In the early twentieth century, most of the increase was linked to emissions of greenhouse gases from robust economic activities, and simultaneous elongation of warm season, warmth and precipitation in certain regions, including Asia, Europe and North America registered significant increase since the 1950s has been shown to be a direct consequence of anthropogenic activities. Although areas such as polar regions and parts of the tropics that contribute to consequential hydrological cycle modification due to the sensitivity of precipitation to temperature change remain under-studied, diligent conference series and assemblies have been organized to address developmental needs. Further, extreme weather events have been intensifying over much of the globe with events such as drought, flood, hailstorm, and hurricane being particularly pronounced. The contexts of climate-related human and environmental establishment, activities, and consequences on safety, security and health are troublesome.

The scaling impact of these climate disasters on human being is better studied state with instances of forced migration, vector-borne disease, famine that may spur rise of human conflicts into peace-time levels in certain area recorded. Drought is to a certain level no exception and worldwide warming up to a widening scale has caused rapid decrement of favorable natural water resources and capability of ecosystem to enrich those over humid climatic regions beyond the phenological time scale, which generate a record number of human-drought affected region and individuals remaining unnoticed. The precedence is a topic of most importance as it encompasses a wide range of vulnerable and marginalized regions the mental health on climate change currently constitute only a peripheral status questioning viability of prior established facts. The extent to which drought impact on human eco-systems beyond the hydrological circle and assess the consequence on climate-induced human mental health can therefore be seen as an essential public demand. Further assessments can be directed onto regions like certain East-Africa area which have been already affected by severe drought on 50% of the population already badly caused a large-scale cascade on related mental health.

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