

In this issue, the following topics are discussed:

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- **Causes of drought**
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- **Vulnerability of communities to drought**
- **Coping with drought**
- **UNEP's initiatives in drought emergency response**

Dear Readers,

It is my pleasure to share with you the third issue of UNEP's Environmental Emergencies News. In the first issue, we informed you that each subsequent issue would have a specific thematic focus and would contain a technical and scientific feature article dedicated to the theme. In keeping with this trend, the focus of this issue is on hydrological hazards - specifically drought hazards.

Drought affects many of us in different ways, either directly or indirectly. Droughts are now receiving more attention due to the recent increase in their frequency and intensity.

In this issue, a simple definition of drought is given and various types of drought are identified. The issue also highlights causes and impacts of drought and addresses the problems of vulnerability of communities to this hazard. Strategies for coping with drought are discussed briefly. Initiatives made by UNEP in responding to drought emergency are illustrated with a brief description of UNEP's response to the La Niña-driven drought of 2000 in Kenya.

It is my hope that the issue will spur interest in the subject of drought and thus assist to intensify efforts to mitigate the effects of this hazard.

Please send us any comments you may have on this issue and submit relevant material for publication in future issues of the newsletter. I wish you pleasant and informative reading.

Svein Tveitdal, Director, Division of Environmental Policy Implementation (DEPI)



Definition and Types of Drought

Unlike other types of hazards, drought is more difficult to define, mainly because drought is often understood better from its impacts than from its causes. Since impacts are specific to the affected region as well as to the affected communities, a universal definition is difficult to develop. However, drought definitions may be either conceptual or operational. A simple conceptual definition of drought is “a prolonged and abnormally dry and hot period when there is scarcity of water for the normal needs of the affected community or ecosystem”. This general definition can be modified to further develop definitions of specific types of droughts such as meteorological droughts, agricultural droughts, hydrological droughts and socio-economical droughts as described below.

Meteorological Drought

Meteorological drought is defined on the basis of the degree of inadequacy of precipitation, in comparison to a normal or average amount, and the duration of the dry period. Definitions of meteorological drought are region-specific, since the atmospheric conditions that result in deficiencies of precipitation are highly region-specific. The variety of meteorological definitions in different countries illustrates why it is not possible to apply a definition of drought developed in one part of the world to another without any modifications.

Agricultural Drought

Agricultural drought links various characteristics of meteorological drought to agricultural impacts, focusing on precipitation shortages. The definitions of agricultural drought attempt to explain the susceptibility of crops to water deficiencies during different stages of crop development.

Hydrological Drought

Hydrological drought refers to a persistently low discharge and/or volume of water in streams and reservoirs, lasting months or years. Hydrological droughts are usually related to meteorological droughts, and their intervals of recurrence vary accordingly.

Socio-Economic Drought

Definitions of socio-economic drought associate the supply and demand of some economic good with elements of meteorological, hydrological, and agricultural drought. Socio-economic drought differs from the other types of drought in that its occurrence depends on the processes of supply and demand. Socio-economic drought occurs when the demand for an economic good exceeds the

supply as a result of a weather-related shortfall in water supply.

Operational definitions of drought help to identify the drought's beginning, end, and degree of severity. This is usually accomplished by comparing the current situation with the historical rainfall average. The thresholds which are identified for the beginning, the end and the severity of a drought are often established arbitrarily using historical statistics.

Causes of Drought

When precipitation over a given region performs poorly and is accompanied by relatively high evaporation rates for prolonged periods, a drought occurs. In most cases, drought is caused by a deficiency of either precipitation or an inadequacy of inland water resources supplies for a prolonged period. “Inadequacy” in this context is a relative word, and is determined by the specific requirements in the sector or activity. Since most inland water resources are usually sustained by precipitation, inadequate precipitation is usually the major cause of drought. This inadequacy is usually caused by an unfavorable performance of the factors which drive the climate system over the affected region. Examples of such factors include sunspot activity, the El Niño/La Niña Southern Oscillation phenomenon and also the wind patterns at the top of the atmosphere.

An increase in the frequency of droughts has also been linked to climate change. Adverse societal factors such as poor land-use practices, conflicts, poverty, poor communication infrastructure and lack of (or poorly implemented) traditional coping mechanisms are also major catalysts of drought disasters.

Impacts of Drought

Drought hazards are a normal aspect of the climate system. They manifest themselves as water stress and continuously intensify as dryness persists. Some droughts last for days while others last for years! Droughts are hazards, but not necessarily disasters. They become disasters when both the natural and human environments become highly vulnerable to the adverse impacts of the drought hazards.

Droughts tend to bring out the worst in the affected communities in terms of land degradation, famine, increases in the prices of essential commodities, impoverishment, retardation of economic development, political and resource use conflicts and breaking down of social ethics.

Environmental degradation accelerates during periods of drought due to:- diminished wetland areas; poor land use activities such as cutting down of trees for fuel; wood and charcoal burning for income; bush and range fires and overgrazing. Environmental degradation is in many cases exacerbated by population pressure and migration of the



Droughts impact negatively not only human activities but also on the environment.

affected communities to marginal lands. The human factor in environmental degradation does not allow the environment to recover even after the end of the drought period. In some cases droughts catalyze desertification, leading to loss of natural resources.

Vulnerability of Communities to Drought

Vulnerability of communities to drought is a function of a number of physical and societal characteristics. The physical characteristics which are associated with maximum vulnerability to drought include:- the existence of a highly variable hydrological and climatic regime that is marginal for agricultural and livestock developments; episodic precipitation patterns which promote high rates of sedimentation and siltation; topography and soil patterns that promote soil erosion; and a lack of variety in climatic conditions across the region which weaken the options for relocation in strategies which are intended to reduce the drought risk.

The societal characteristics that maximize vulnerability to drought include:- poverty and low income levels; conflicts and wars; pandemics; high dependence on rain-fed systems; lack of controls for strengthening security in water supplies and consequently in crucial water uses such as irrigation and hydro-power generation; poor planning and management of agricultural water supply and irrigation systems; high population densities and other factors that inhibit population mobility and implementation of traditional coping mechanisms; inexperience of communities to cope with droughts; and unwillingness of communities to live with some drought risks as a trade-off against beneficial services or goods.

Societal and physical characteristics of vulnerability reinforce each other differently and at different levels of severity in different parts of the world. Thus, some regions are affected by drought more severely than others.

Coping with Drought

Coping with drought hazards can be enhanced by developing strategies which adequately address the following questions:

- How frequently or extensively does a certain type of drought occur in a given region?
- What are the vulnerabilities and expected losses which are associated with the particular type of drought?
- What are the costs of implementing the plausible strategies or options for mitigating the disaster that can be caused by that type of drought?

Such strategies aim at reducing the vulnerability of drought-prone communities by either altering or strengthening their land use and farming practices as well as implementing programmes that promote water and food security, which also enhance poverty alleviation. The slow onset of drought combined with drought-forecasting capabilities also enables implementation of preparedness and preventive plans and measures in advance of the occurrence of the drought disaster. The improvement in recent years in seasonal and long-term climate predictions such as those issued by many national and regional institutes and centers is assisting in the implementation of drought disaster mitigation and implementation of effective drought-contingency plans.

Other response mechanisms, mitigation procedures and assessment procedures that help to answer the above questions include:

- Drought vulnerability and impact assessments;
- Enhancing mechanisms for drought preparedness;
- Capacity building and awareness creation in drought coping methods;
- Enhancing coordination of drought response and recovery mechanisms.

UNEP's Initiatives in Drought Emergency Response

One of the most significant initiatives of UNEP in responding to drought emergencies is illustrated by its response to the



Many pastoral communities in Kenya lost most of their livestock during the La Niña induced drought of 2000.

La Niña induced drought of 2000 in Kenya. The most severe drought in Kenya's history was experienced in most parts of the country during this period. This drought was also severe in all countries in the Horn of Africa. The drought in Kenya had wide ranging impacts on the society, the environment and also on the economic sectors of development in the country.

On 13 June 2000, the Government of Kenya declared the drought a national disaster. As a result, the government of Kenya requested for support from UNEP to alleviate or mitigate further adverse impacts of the drought on the environment. Subsequently, UNEP agreed to collaborate with the government to undertake a rapid assessment of the impacts of the drought. The outcome of this exercise was a report entitled, "Devastating Drought in Kenya – Environmental Impacts and Responses". The report identifies several factors which exacerbated the severity of the drought, namely:

- Increase in the frequency of droughts and extension of drought conditions to areas usually not affected;
- Weakening of local coping methods;
- Deteriorating environments as a result of inappropriate land-use and farming practices;

- Land tenure systems which restrict access to essential resources;
- Poor security and communications infrastructures that restrict animal and human mobility;
- Inadequate preparedness;
- Poverty; and
- Lack of an effective marketing infrastructure for livestock and other farm products.

The report contains:

- A comprehensive assessment of the effects of drought on the environment and the factors which contributed to its seriousness;
- Detailed recommendations on preparedness and mitigation measures to cope with future droughts;
- Detailed strategies for medium- and long-term post-disaster assistance in the country; and
- Recommendations on the immediate and long-term measures and strategies needed to address damages caused by the 2000 drought.

The UNEP Task Force on Environmental Emergencies (TFEE) played a significant role in coordinating UNEP's response to this drought.

Selected Websites related to Drought Emergency and Response

1. UNDP's Dryland Development Center' – <http://www.undp.org/drylands/>
2. International Strategy for Disaster Reduction (ISDR) – <http://www.unisdr.org>
3. World Meteorological Organization (WMO) – <http://www.wmo.ch/>
4. United Nations Development Programme (UNDP) – <http://www.undp.org/ind/disaster.htm>
5. Office for the Coordination of Humanitarian Affairs (OCHA) <http://www.reliefweb.int/>
6. United Nations Food and Agriculture Organization (FAO) – <http://www.fao.org/>
7. The Network on Food Security (FEWS NET) – <http://www.fews.net>
8. The Drought Monitoring Center, Nairobi, Kenya – <http://www.dmcn.org>



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