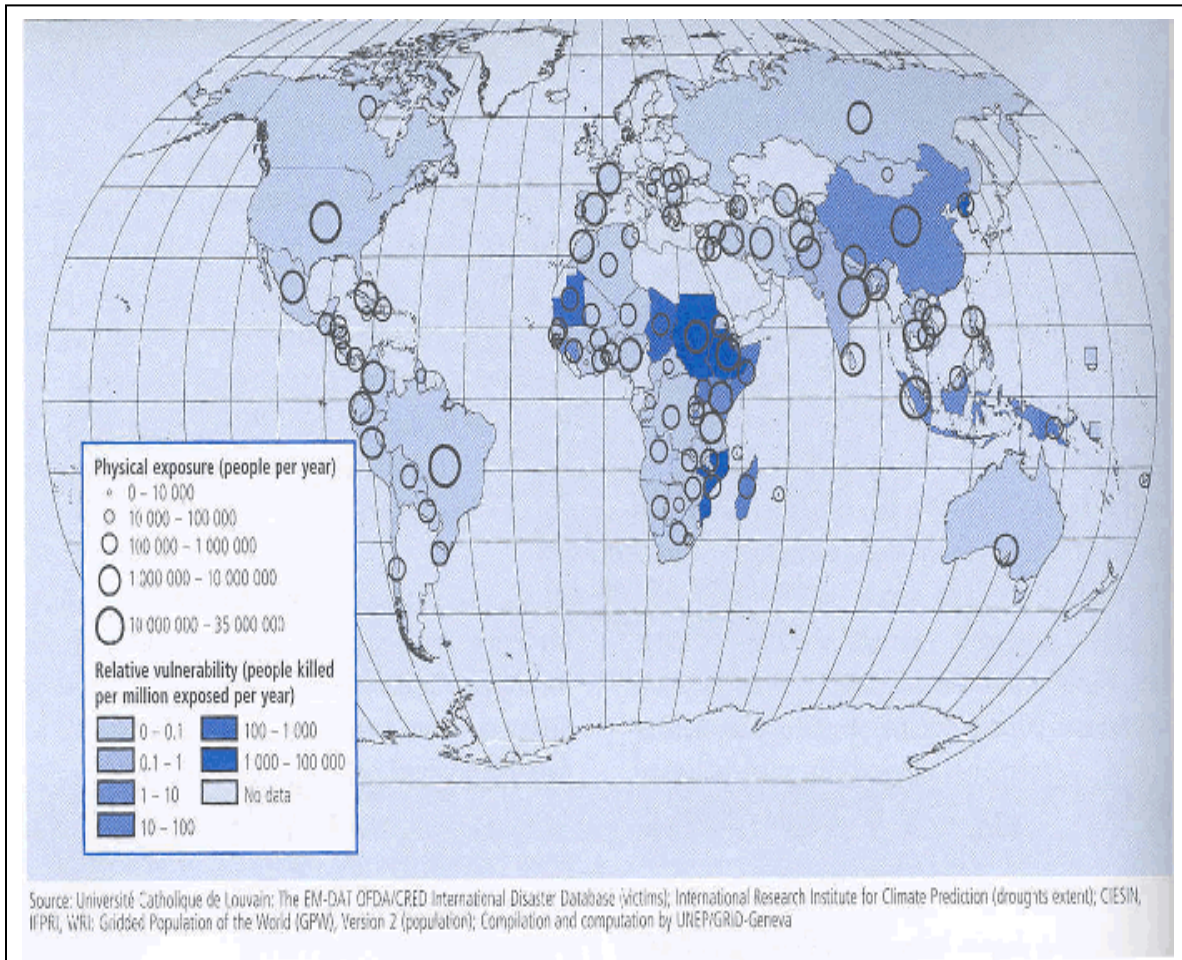


Figure 2
Physical exposure and relative vulnerability to drought, 1980-2000



2.0 The way we think about drought risk affects the way we manage it

Different groups have different perceptions, tolerances and capacities to manage various types of risk. Similarly, drought affects different groups in diverse ways, for example pastoralists as opposed to farmers living in drylands. This section explores how human societies adapt well or poorly to drought, which may be a function of an inadequate understanding of drought and/or inappropriate policy. This is illustrated by examples from North America and the Sahel region of Africa. Finally, drought is examined as a situation-specific management challenge and various types or conceptions of drought identified and the environment implications examined.

2.1

Drought affects different groups in diverse ways

Drylands users such as pastoralists can be seen on the one hand as exposing themselves to the risk of drought impact by 'choosing' to live in drought-prone environments, but their livelihood strategies provide evidence that they are highly capable, specialized risk managers. Nevertheless their livelihoods often suffer drought impacts the most. This is because their level of vulnerability is largely determined by factors beyond both their knowledge and in particular beyond their control. They have built up an excellent knowledge of rainfall patterns and are able to cope with even severe droughts; however, they may know little of and have less control over national policies of land tenure or other issues which may undermine their risk-management systems.

It is important to distinguish at this point between risk and uncertainty. To continue with the example above, pastoralists have an idea of objective risk of the rainfall leading to drought, but little knowledge of which types of policy decisions might be made which could impact their livelihood system and coping strategies, whether and when such decisions may be made or what the consequences will be. As such, they are not in a very good position to prepare for them, increasing their vulnerability.

Similar principles apply to farmers in drylands. For example, a survey done in northern Nigeria during the great Sahelian drought of 1973-74 revealed some of the adaptive responses to famine; among these are use of famine foods (drought resistant foods), divestment, income diversification and mobility (Mortimore 1998). In this region, as others, seasonality bestows both the opportunity and sometimes the necessity for diversification for dryland households. In West Africa, informal economic integration of the Sahelian and wetter coastal regions has long been formalized in dry season migration as well as in permanent transfers of population (Michael 1998).

In short, different groups have different approaches and capacities to manage risk as a function of their opportunities, situation, experience and this variety needs to be taken into account when devising drought risk policy. Some of the factors which explain whether a group adapts or maladapts to drought include lack of climate trend information, perverse policy incentives, and the nature of the relationships between drought and development.

2.2

Inadequate understanding and/or inappropriate policies increase drought vulnerability even in developed countries

A recent climate analysis reported in the journal *Science* shows that an unusually wet period in North America at the beginning of the 20th century encouraged immigrants from the overcrowded northeast of the US to spread into the Midwest, a process further promoted by land grants and other policies designed to settle the states in this area. High cotton prices also acted as an incentive and resulted in the planting of inappropriate, water intense crops. Then when rainfall patterns switched in the late 1920's and early 1930's it resulted in the well-known dustbowl. Farming techniques brought from areas of more reliable rainfall as well as widespread overgrazing due, in part, to new technologies such as barbwire fencing also played a role. In Canada during the wet decades of the 1950's to 1970's large-scale drainage of the Prairies was undertaken, including leveling, paving the way for mechanized monocropping (Herriot, 2003). This approach was strongly encouraged by agricultural support and the advice structures of the state. It also had the effect of greatly decreasing surface water storage. Recent severe droughts have revealed that ecosystem function has been undermined in terms of regulating the hydrological cycle, only apparent during a climate-induced stress.

Similarly, in the Sahel in the 1960's, which was a period of above-average rainfall in that region, farmers moved into areas which were really only suited for, and had traditionally been used for, less water-intense production. Again, this was reinforced by policy, both government and donor, which saw cereal production as the key to food security, cash crop production as the source of revenue for the newly independent states and pastoralism as an outdated and inefficient - even embarrassingly primitive mode of production. This led to an implicit 'right of the hoe' in land tenure policy, a perverse incentive which even saw pastoralists farming in highly damaging and uneconomic ways, simply to claim land. Not surprisingly, when lengthy droughts struck from the late 1960's through the mid 1980's the consequences were far greater than would otherwise have been, as the mode of development chosen by these societies had unwittingly greatly increased their exposure to risk and their vulnerability to its impacts.

2.3

Drought is situation-specific and this should be reflected in policy

In order to devise appropriate policies for water and food security and productivity with respect to drought it is important to be specific about the context. Generally drought experts distinguish between four main types of drought; which are really different ways of looking at the same thing:

- **Meteorological drought:** A below average rainfall
- **Agricultural drought:** An insufficient and/or inadequately distributed rainfall for crop production
- **Hydrological drought:** A lower- than-average flow in rivers, low levels in reservoirs
- **Socio-economic drought:** A lower-than-average supply of an economic good as a knock-on effect of one or more the above forms of drought.

The last could also be thought as drought triggered food insecurity due to vulnerable socio-economic conditions of either of particular group or even an entire society. This could even lead to what Cannon (2004) calls a 'policy famine', which is an artificial shortage caused by disastrous policy or the use of food as a weapon.

In setting drought in its context for the purpose of analysis one could even be more specific; conditions which lead to a 'wheat-drought' would not also cause a 'goat drought'. Therefore if land use were to change there would be a change in drought frequency without a change in weather or climate (Warren and Agnew 1988). Of course a use-specific definition of drought might be difficult to operationalize but it can also be very revealing for the purpose scenario building and identification of options. Such an analysis can reveal the degree of weather-dependency of a social choice. By social choice we mean the objectives into which society puts its resources, which always means taking resources away from some current or potential use. This is clearly a political decision and therefore one which is rarely made purely on the basis of science, even though the rationale which justifies the decision may employ technical-sounding explanations. For example, what is really a socio-economic drought resulting from choices which reflect powerful interest may be characterized as an unavoidable 'Act of God'

This is made easier by the fact that the relationship between the natural and socio-economic factors explaining drought impact can be difficult to disentangle. For example, a study of the wider socio-economic consequences of drought in Southern Africa revealed that the impacts of climatic variability are readily apparent, but more difficult to quantify, because they are partly the result of or act through other influences. Furthermore, the impacts of climatic factors change from event to event, depending on the pattern and severity of each climatic anomaly, which typically have distinctive features. The scale and form of impacts were also found to depend on the structure of the affected economy and on the changing political and economic environment (Clay 2003). In short, the development of policy which accounts for drought risk is an analytical challenge made

more complex by the political advantages of portraying drought impact as essentially the inevitable result of the whims of nature

3.0 Relationship(s) between drought, food security and sustainable development

Building upon the proposition and finding developed thus far, this section introduces the complex interactions between drought, food security and sustainable development. Furthermore, it raises the question of whether and how governments and development agencies can address this issue through the integration and mainstreaming of drought policy with other development issues in order to realize sustainable development. A simple model of two ideal-type societies, one drought vulnerable and another drought resilient is used to illustrate the complex interactions between drought and other factors which influence development, which in turn mediates the impacts of drought.

3.1 Drought and development

There are complex interactions between drought, food security and sustainable development. Drought has profound effects on food security, especially in less developed countries and particularly where economies are heavily weather dependent. Whenever there is a severe drought or prolonged famine the affected populations draw upon their 'social adaptive capacities', typically complemented by aid and relief food. A number of development actors have recognised the complex interactions between drought and food security and are consequently seeking to integrate and mainstream drought issues into broader development initiatives in order to realise sustainable development, the definition of which must include resilience to climate shocks.

3.2 Vulnerability and resilience to drought

The United Nation Inter-Agency Working Group on Drought (2003) has generated a simple model of two 'ideal type' societies for the purpose of illustrating some connections between drought and the socio-economic complex it acts upon; one a 'drought vulnerable society' and the other a 'drought resilient society'. These are represented graphically in the following two figures which illustrate the complex interactions between drought and other factors. UNDP-DDC tested this analytical tool with the Environment Group of Ethiopian parliamentarians, inserting Ethiopia-specific information, and found it to be a useful aid in identifying key relationships and the implications of policy decisions on drought vulnerability.

They also repeated this analysis for a series of major droughts in Ethiopia, asking each time whether drought impact had increased or decreased and if so why. This exercise provided a rapid sketch of the evolution of policy thinking and drought practice in Ethiopia over the last three decades. This is one example of how analytical tools can be developed in order to help policy makers think through how to best "drought proof" their population and economies and safeguard their development gains.