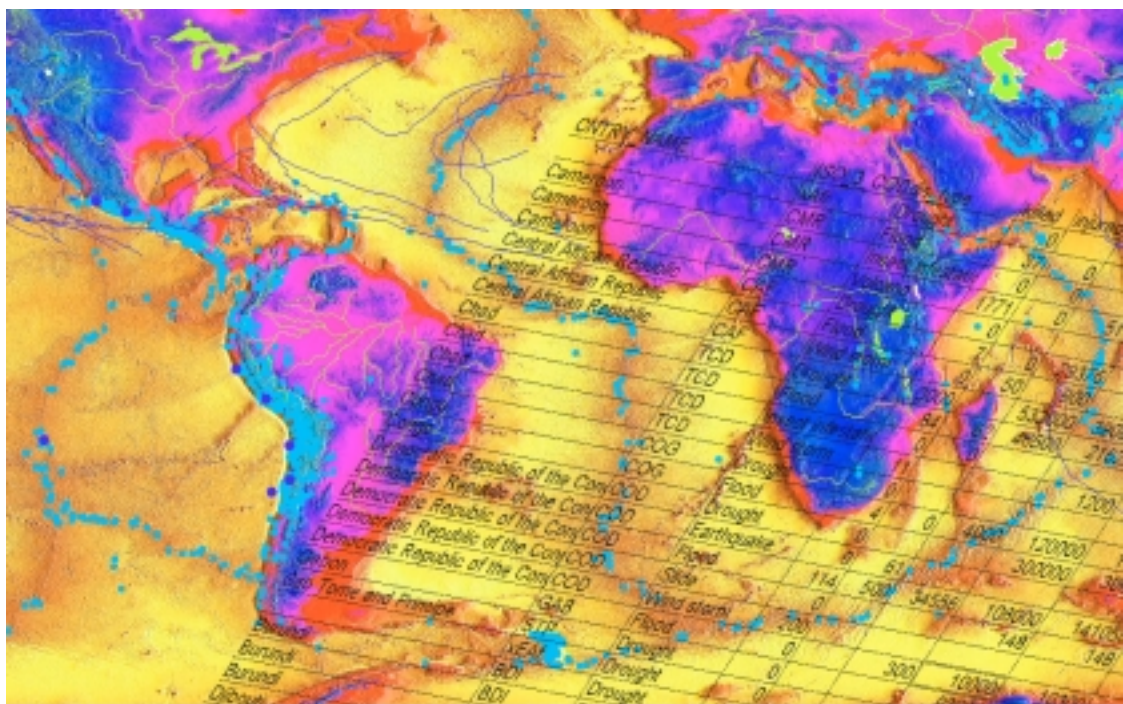


Global Risk And Vulnerability Index Trends per Year (GRAVITY) Phase III: Drought analysis

Technical report for:

United Nations Development Programme
Bureau of Crisis Prevention & Recovery (UNDP/BCPR)



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Table of acronyms

AGR_{EMP}	Percentage of labour force in agricultural sector
BCPR	Bureau for Crisis Prevention and Recovery
CRED	Centre for Research on Epidemiology of Disasters
FAO	Food and Agriculture Organisation
GDP_{AGR}	Percentage of agriculture's dependency for GDP
GDP_{CAP}	Gross Domestic Product per capita
GEO	Global Environment Outlook
GIS	Geographical Information System
GLASOD	Human Induced Soil Degradation
GRAVITY	Global Risk And Vulnerability Index Trend per Year
HDI	Human Development Index
HPI	Human Poverty Index
IFRC	International Federation of the Red Cross
IRI	International Research Institute for Climate Prediction
ISDR	International Strategy of Disaster Reduction
PhExp	Physical Exposure (if not specified, for drought)
U5_{MORT}	Under five years old mortality rate
UNDP/BCPR	United Nation Development Programme, Bureau for Crisis Prevention and Recovery
UNEP/GRID	United Nation Environment Programme, Global Resource Information Database
WAT_{RUR}	Percentage of population having access to improved water supply in rural area
WAT_{TOT}	Percentage of population having access to improved water supply
WAT_{URB}	Percentage of population having access to improved water supply in urban area

INTRODUCTION

Among the different recommendations from the two previous GRAVITY reports, drought was the obvious significant missing hazard. In the first GRAVITY report (feasibility study) food insecurity was highlighted for producing the largest amount of casualties. Nevertheless, due to time restriction and complexity to model such hazard, this important issue was left unstudied. The problem for the UNDP World Vulnerability Report (WVR) was that if drought was not included, a global approach on vulnerability to human development would not be achieved: as most of Africa is deeply affected by such events.

Drought and food insecurity: a complex hazard

Drought isn't purely a natural hazard as it includes strong human induced causes (such as conflicts, bad governance,...). Even when dealing with the physical drought component, the lack of precipitation has fuzzy boundaries and it is therefore very difficult to draw a line between regions affected by drought and others. The duration of a drought also causes significant problems, not only the beginning and end of an event is difficult to specify, but some drought last for several years and continue to affect populations long after precipitation have return to normal. This is due to long term effects on human organisms, as well as decline of agriculture capabilities through soil deterioration and lack of seeds for new plantations.

Moreover, the same deficit in precipitation may not induce similar impacts depending on types of soil, vegetation and agriculture as well as differences in irrigation infrastructures. To further complicate this issue, the casualties are not resulting from physical drought but from food insecurity, thus including a human causes such as conflicts, political tensions, bad governance are even harder to model not even talking about international acceptance of such highly touchy subject.

Need for a simplification of the problem

In order to represent such complexity, a tremendous amount of data and knowledge is requested, which contributed to prevent the creation of a global data set during past decades. To overcome this problem, the study used a simple index designed by IRI at Colombia University (New York) based on deficit of precipitation. Then the GRAVITY team from UNEP/GRID-Geneva computed physical exposure and related vulnerability parameters. Although other components of food insecurity were misted out, the results were more successful than originally thought. It is believed that with the notable exceptions of Mozambique and Sudan where conflicts have too much implication on food insecurity, for the remaining countries, the physical drought has a sufficient influence on the ignition of such crisis to allow a correlation.

This study has not the pretension of having completed the subject, however it has initiated the movement and it is hoped that this will stimulate researches on this issue, thus leading to new improvements in the field of vulnerability toward natural hazards. Although the subject is not completed as other hazards needs to be added such as landslides, tsunamis or epidemics, it is believed that the gap has been sufficiently narrowed. New elements provided such data and methods gathered are now available to contribute to the first edition of the WVR.

1 DATA

1.1 Vulnerability indicators

The list of vulnerability indicators for drought and socio-economic data were provided by UNDP/BCPR.

In addition to socio-economical indicators used in GRAVITY-II a certain new number of requests were formulated in order to estimate the vulnerability to drought. However, the availability and quality of data has limited the number of new data sets to the following.

Table 1. Vulnerability indicators

Categories of vulnerability	Indicators	Sources
Economic	1. Gross Domestic Product per inhabitant at purchasing power parity, 2. Human Poverty Index (HPI)	GEO
Type of economical activities	3. %age of agriculture's dependency for GDP 4. %age of labor force in agricultural sector	GEO
Dependency and quality of the environment.	5. Human Induced Soil Degradation (GLASOD)	UNEP
Development	6. Human Development Index (HDI)	UNDP
Health and sanitation	7. %age of people with access to safe water (total, urban, rural) 8. Under five years old mortality rate	GEO GEO

GEO : Global Environment Outlook Data Portal (UNEP), based on data from FAO, WRI, World Bank and other sources / WB : World Development Indicators (World Bank) / TI : Transparency International / UNDP : Human Development Report (UNDP)

1.2 Population data

Extraction of population was based on the CIESIN, IFPRI, WRI Gridded Population of the World (GPW, Version 2) at a resolution of 2.5' (5 km at the equator). This choice was performed for reason stated in GRAVITY-II report. This layer was further completed by *Human Population and Administrative Boundaries Database for Asia* (UNEP) for Taiwan and CIESIN *Global Population of the world version 2* (country level data, 1995) for ex-Yugoslavia.

1.3 Data on victims

预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_11887

