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الملتقى السري الثاني لتنظم المعلومات الجغرافية



# Climate Change and Population Dynamics: A Conceptual Framework

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# Background- Introduction

- The relationship between climate change and the population basic parameters is a two-way relationship, each affecting the other. Climate's impacts on people are through its crucial effects on their livelihood systems, but not on them as species because the human being is the most adaptive of all creatures even to extreme climatic conditions.

# Background- Introduction

- On the other hand, the impacts of people on climate are rather slow and cumulative, and can attain catastrophic levels, through the irrational use of the natural resource base if left unbarred,
- thus, keeping the population parameters – spatial distribution and movement, birth rate and mortality rate – within the required bounds requires the sustainability and enhancement of comprehensive development which, in turn, necessitates the sustainability of enabling climatic conditions.

**Table (1): Some Human Development Indicators in the Sudan, 2010**

Source: U N D P (2010), Human Development Report, N.Y., UNDP

Indicator	Value
Life expectancy at birth (years)	58.9
Mean years of schooling	2.9
Expected years of schooling	4.4
Gross national income (G N I) per capita (U S D)	2051
G N I per capita rank minus HDI rank	-22
Population living in degraded land	40%
Population without access to safe water	43%
Population without access to sanitation	60%
Poverty rate among rural population	57.6%
Poverty rate among urban population	26.5%

Source: U N D P (2010), Human Development Report, N.Y., UNDP

# Background- Introduction

- Furthermore, most of these countries are the least contributors to climate change (i.e. in the Sudan per capita emissions of carbon dioxide was 0.3 tons in 2006 ) , their communities are the most vulnerable to it, are the hardest hit by its impacts, and have the poorest adaptive mechanisms to the impacts of climate change.

# Aim/objectives/study area-framework

- This paper attempts to sketch a general conceptual framework for the relationship between climate change and population dynamics in the tropical and sub-tropical, under-developed countries because, although each of them has its own specificities, they have a number of climatic, socio-economic, demographic and political commonalities.

# Material and Methods

## 2-1- Climate change:

- The exact and detailed particularities of the impacts of the greenhouse gas emissions are not yet conclusively determined, and they are still being researched, and various scenarios computed. Nevertheless, climate change is now a scientifically established fact, and has already started to cause grave risks; some of which may be potentially catastrophic and can be a serious threat to the human civilization

# Material and Methods

- IPCC(2007) states that global warming has already started to manifest itself in a number of ways: decreased frost and lower frequency of cold nights and cold days in temperate climatic zones; drought has become longer and more intense than before and rainfall has become less in amount and duration in tropical and subtropical climatic zones.

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# 2-2- Impacts of climate change:

- People live within the ecosystem which is an interdependent functioning system constituted by plants, animals and micro-organisms, and climate is a natural part of it.
- Although the natural equilibrium of the ecosystem is generally distorted by the excessive and irrational human intervention and interaction, climate has the potential to change ecosystems and many of the resources and services they provide to each other as well as to society.

- It is predicted that global warming would lead to massive extinction of species, especially micro-organisms, increased and intense drought and desert encroachment which will aggravate the environmental crisis, reduce biodiversity, and possible collapse of biological and ecological systems.
- Drought-affected areas in sub-Saharan Africa (including the Sudan) could expand by 60-90 million hectares (UNDP, 2007). This is an expansive process because ecological deterioration and lower bio-productivity leads to the use of more fragile ecosystems, and hence desertification.

- Marine ecosystems are no exception; 50% of the world coral reefs have already suffered bleaching as a result of warming seas; and increasing acidity of the seas and oceans is a long term threat to marine ecosystem (UNDP, 2007). In Sudan coral reefs of the Red Sea are one of tourist attractions to the country.
- The deterioration of the bio-productivity of the ecosystem in Sub-Tropical Africa has considerably reduced the supportive capacity of the rural economy upon which most of the population depends. This failing rural economy has driven

- most of these communities into poverty and destitute; about one billion persons are living at the margin of survival on an income of one dollar per day, and 206 billion people (40% of the world population) on two dollars per day (most of the under- developed countries, including the Sudan); by the year 2050, loss in revenue is estimated at 26% in Sub-Saharan Africa (including the Sudan), (UNDP, 2007).

# Results and discussion

- The major climate –related reasons for the spatial movement of people include: Desertification, drought and rainfall variability leading to crop failure or serious decline in productivity, lower income and eventual poverty pushes farming individuals or families to migrate in pursuit of a better livelihood in urban centres. This is true of almost all under-developed countries.

- It is important to integrate climate change as a cross-cutting issue in development plans because it tends to exacerbate existing socio-economic and political stresses, especially where people depend heavily on climate-vulnerable sectors such as agricultural, animal, forest and water sectors. Such integration or mainstreaming will ensure that climate change adaptation and poverty reduction are implemented hand-in-hand, and will reduce vulnerability, increase adaptive capacity and realize sustainable development.

# 5 steps

- To this end, the N.I. (2012) has identified five steps :
- Creation of a country **climate profile**.
- Preparation of an **institutional map**.
- Engagement of **shareholders**.
- **Assessment** of climate change risks and opportunities.
- **Building the capacity** of stakeholders.

# Conclusion

- Given the number of summit conferences held to address the problem of global warming, the convergence and divergence on the required practical actions, and the nature of the capital-driver world economic system and of national governments in the under- developed countries, **it seems that high hopes and optimism would be kept within bounds.**

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**Thank U**