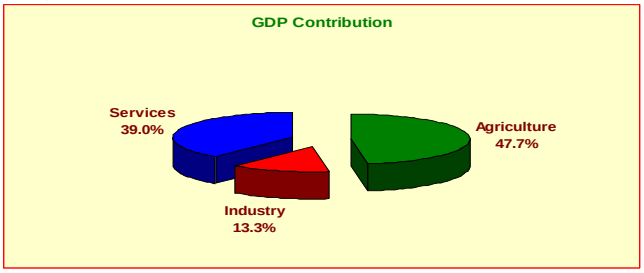
DRAFT
Work-in-Progress

Ethiopia: Climate Risk Factsheet

GDP (US$ billion; 2005)[1]:	US$11.2
Population (million; 2005):	71.3
Population living on less than $2/day (%)[2]	77.8
Land Area (1,000 sq km)	1.000
Agricultural land (percentage of total land area, 2005):	32



	Historical Climate Trends	Projected Future Climate Trends
Temperature	The average annual temperature (1961-1990) was 23.08'C (Cline 2007). Ethiopia is characterized by diverse climates which translate into diverse vegetation zones. According to the Koeppen-Geiger climate classification system, Ethiopia has 10 climate types, including: the Hot Arid, Hot Semi-Arid, Tropical with distinct dry winter, Tropical Monsoon Rainy with short dry winter, Warm Temperate Rainy with dry winter, and Warm Temperate Rainy without distinct dry season. Coldest temperatures - about 5ºC (November to January) over the highlands of Central, North, and Southeast Warmest temperatures - about 37ºC (March to May/June) in Northeast (Afar) and SE Lowlands	The annual average temperature between 2070-2099 is projected to be 26.92 °C. (Cline 2007) According to the country's First National Communications to the UNFCCC, temperature across the country could rise by between 0.5 and 3.6 degrees Celsius by 2070
Rainfall	Annual mean rainfall ranges from about 2000 mm (SW) to about 100mm (NE Lowlands of Afar) . Present average precipitation is 2.04 mm per day, annual averages between 1961-1990 (Cline 2007)	On a country aggregate level Average precipitation 1.97 mm per day simulations suggest that the average daily rainfall amount will lie around 1.97 mm between 2070-2099 (Cline 2007). Decreases in rainfall amount will be exacerbated by higher evaporation rates associated with the increasing temperatures. Projections of precipitation are more uncertain than projections on temperature and considerable regional variations exist. According to the country's First National Communications to the UNFCCC, precipitation is expected to decrease in the northern regions, while southern areas could see an increase of as much as 20%.

Current Sustainable Development Challenges:

Economic
- The level of economic development is low
- Access to basic services is poor (e.g. an avg. developed world resident consumes as much electricity as 400 Ethiopians)
- Highly dependent on rainfed agriculture

Social
- Population pressures are high (>72 m population)
- Poverty is high (about two thirds of the population earns less than $2/day

Environmental
- Hydrologic variability is high
- Land and water resources planning and use not optimal
- Rich biodiversity areas (e.g. Lakes) at risk

Institutional
- Environmental and resource knowledge base is poor (e.g. good quality computerized hydro-climatological databases)
- Flood forecasting and communication systems are weak

[1] World Bank, The Little Green Data Book, 2007.
[2] World Bank 2007, values are based on country surveys conducted between 1989 and 2005

Sector Implications of Climate Risks:

Agriculture: Food insecurity is an integral part of poverty in Ethiopia**.** Climate change is projected to reduce yields of the wheat staple crop by 33% (NAPA). At present, agriculture dominates the Ethiopian economy, accounting for nearly half of GDP and for the vast majority of employment. While the country is highly dependent on the agricultural sector for income, foreign currency, and food security, the sector is dominated by small-scale farmers who employ largely rain-fed and traditional practices – a state which renders Ethiopia highly vulnerable to climate variability (as seen during past persistent drought), and thus to climate change. Desertification, brought on by human land-use pressures and recurrent drought, has consumed significant land area and continues to threaten arable land.

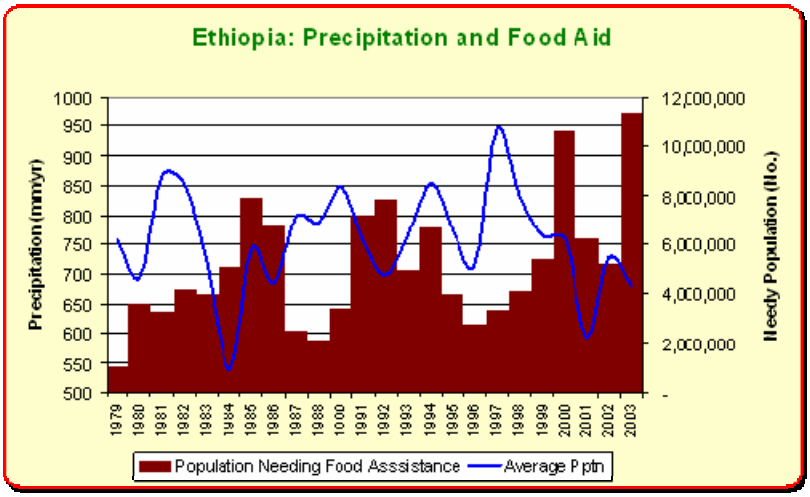


Figure: The impact of drought shocks in Ethiopia

	People in poverty (%)
Observed poverty	47.3
Predicted poverty with no drought shocks	33.1
Predicted poverty with no shocks of any kind	29.4

Source: UNDP, Human Development Report 2007/2008: Fighting Climate Change

Ethiopia has experienced at least five major national droughts since 1980, along with literally dozens of local droughts. Cycles of drought create poverty traps for many households, constantly thwarting efforts to build up assets and increase income. Survey data show that between 1999 and 2004 more than half of all households in the country experienced at least one major drought shock These shocks are a major cause of transient poverty: had households been able to smooth consumption, then poverty in 2004 would have been at least 14% lower a figure that translates into 11 million fewer people below the poverty line (see figure below).

Agropastoral and pastoral households, which are reliant on livestock for their livelihoods, also suffer severe asset losses during droughts. As experience in Ethiopia has repeatedly shown, the consequences are likely to include adverse impacts for their terms of trade, with livestock prices falling sharply relative to cereal prices.

Water Resources: Water resources: run-off to Nile tributaries (Abay and Awash Rivers) is projected to be reduced by up to one third due to climate change. Ethiopia has twelve major river basins, including the Blue Nile. Its riparian systems, combined with its eleven major lakes, make Ethiopia the "water tower" of Northeast Africa. Climate change is projected to cause a drying of wetlands (affecting threatened bird species breeding sites). Although, Ethiopia has relatively abundant water, it has one of the lowest reservoir storage capacities in the world: 50 cubic metres per person compared with 4,700 in Australia (UNDP HDR, 2007/08). In Ethiopia and Kenya, two of the world's most drought-prone countries, children aged five or less are respectively 36 and 50 percent more likely to be malnourished if they were born during a drought. For Ethiopia, that translates into some 2 million additional malnourished children in 2005 (UNDP, HDR 2007/08). In Ethiopia and Kenya, two of the world's most drought-prone countries, children aged five or less are respectively 36 and 50 percent more likely to be malnourished if they were born during a drought. For Ethiopia, that translates into some 2 million additional malnourished children in 2005 (UNDP, HDR 2007/08).

Health: Climate change is projected to cause encroachment of malaria from lower altitudes in Somalia and Afar regions to higher altitudes in Tigray and Amhara (NAPA 2007). The total population at risk of endemic malaria for the year 1990 in Ethiopia in areas where the climate is more than 75% suitable for malaria (malaria endemic; perennial or seasonal) was 6,508,530 (source: http://www.mara.org.za/popatrisk.htm#Prev)

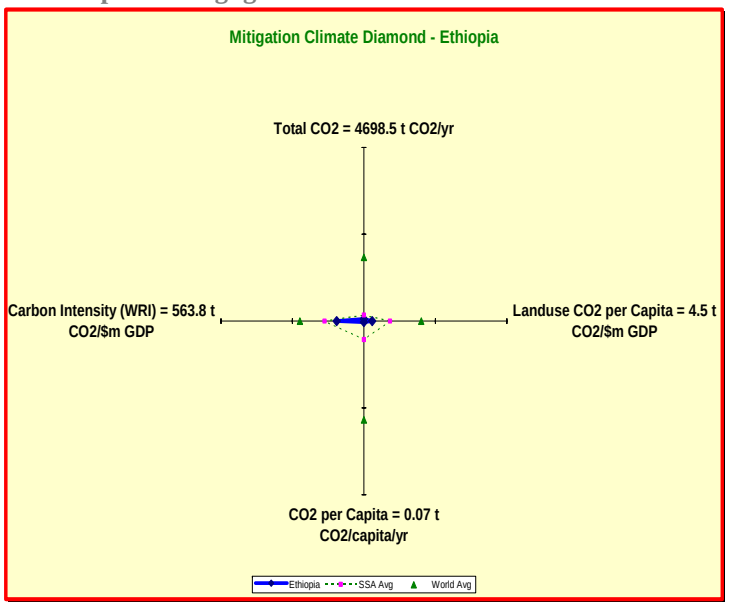
In Ethiopia, an epidemic of cholera following the extreme floods in 2006 led to widespread loss of life and illness (UNDP HDR, 2007/08).

Energy: Deficits in access to modern energy can create a vicious circle of environmental, economic and social reversal. Unsustainable production of charcoal in response to rising urban demand has placed a huge strain on areas surrounding major cities such as Addis Ababa in Ethiopia. In some cases, charcoal production and wood collection has contributed to local deforestation. As resources shrink, dung and residues are diverted to fuel use instead of being ploughed back into fields, undermining soil productivity.

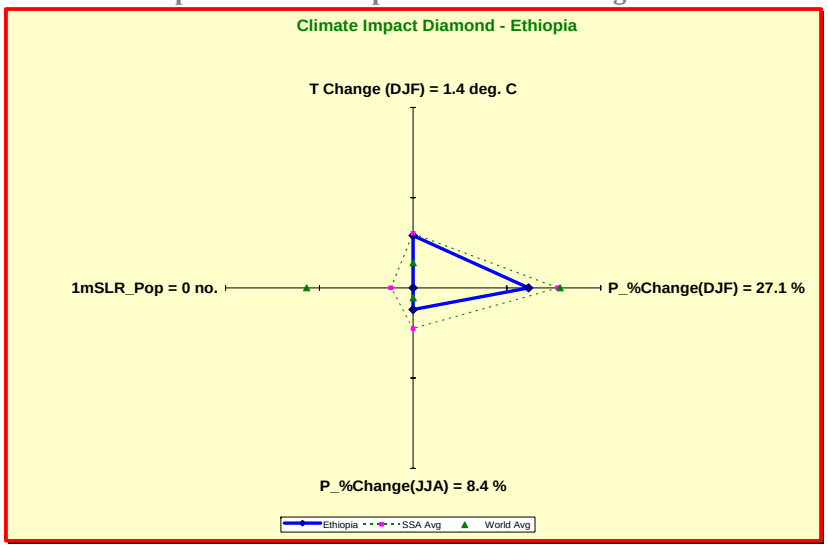
Climate Change an Ethiopia: A Graphical Perspective

Income Variability trails rainfall variability in Ethiopia

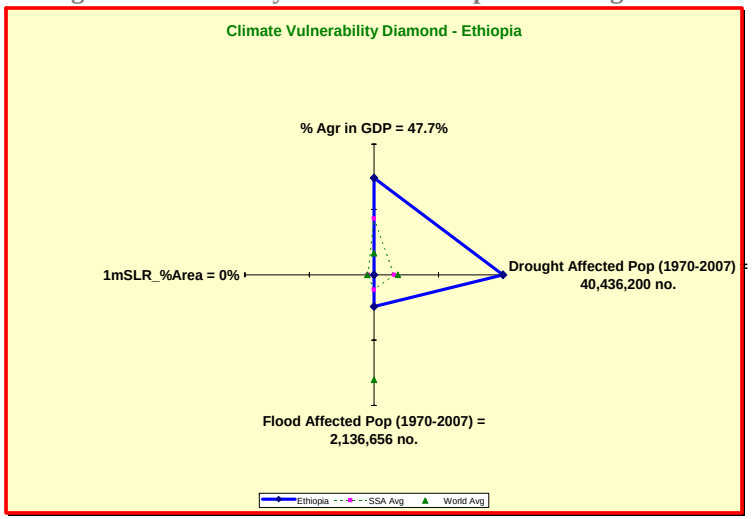
Ethiopia has negligible contribution to Greenhouse Gases



Precipitation and Temperature Risks are Significant



The largely rural agricultural population subsisting primarily on traditional rainfed agriculture are very vulnerable to repeated droughts and floods



Recommendations for Improved Management of Climate Risks

Overall Objective: Improve climate-smart development through appropriate institutional and investment activities.

SECTOR	Enabling Environment/ Capacity Building	Investments
Capacity Building & Cross-cutting	- Develop and strengthen the Knowledge Base o Data and information – acquisition, analysis, dissemination, utilization o Enhanced hydro-meteorological monitoring systems, and improved and expanded human resources in the hydrological and meteorological services o Analytical tools and products tailored to sector needs o Information on adaptation options based on pilots, field tests and research o Early warning systems o Information exchange networks to enable access to and exchange of data and information between all levels of user and decision makers - Regional and National Networks – Networks of agencies and policy makers, experts, knowledge bases, data and information, research and field experience (pilots, tests) is crucial to stimulating and facilitating investment in adaptation	- Introduce modern technology for data collection, transmission and assessment; Introduce the use of compatible standards and systems to enhance data and knowledge sharing across sectors; - Strengthen and expand systematic observations of meteorological and hydrological parameters; strengthen the technical capacity of hydro-met services including the development and dissemination of knowledge products to enhance the adaptation of project design and implementation to climate variability and change; - Strengthening and develop early warning systems for drought and flood hazards and natural disasters to improve preparedness, response and recovery in all the sectors (agriculture, health, natural resource, and energy)
Agriculture (including irrigation, watershed management, community development)	- Develop flood, drought and drainage risk maps to enhance sector development planning - Combine risk mapping with river basin and sub-basin water resource assessments including rainfall variability - Improve awareness of and analytical underpinnings of sustainable land management policies and practices	- Scale up investment in research and extension services to enhance production and farm incomes with a new emphasis on adaptation to climate variability and change - Invest in piloting and scale up of SLM practices, including crop diversification, cropping patterns (at farm scale), and new technology packages (both for adaptation and carbon sequestration) to enhance adaptation in areas with high climate variability and vulnerability to change - Scale up investment in the introduction of irrigation and water management systems and appropriate technologies, especially water conservation in drought prone areas - Scale up investment in livelihood focused participatory rural develop including sustainable land management, watershed management and community driven development (CDD) approaches - Pilot risk insurance schemes including indexed crop insurance
Water Resources Mgt	- Improve technical capacity of water resource management agencies including hydro-met and groundwater management services - Institutionalize multi-sector, integrated water resources planning and management - Strengthen the analytical and modeling capability of water resource agencies to utilize enhanced hydrologic and metrological data acquisition and monitoring networks and support river basin and sector development and management planning o River basin and sub-basin water resource assessments and the associated institutional capacity to sustain such program on a continuous basis o Systematic assessment of potential storage for	- Scale up investment in sustainable land and water resource management practices, which improve efficient use of water resources, reduce environmental degradation of watersheds and siltation of river beds - Pilot and upscale investments in water storage and irrigation systems, based on systematic assessments

SECTOR	Enabling Environment/ Capacity Building	Investments
	irrigation, hydropower, water supply, flood management and wetland conservation, including strategic climate risk assessment o Development of decision support systems (DSS) including hydrologic models and other analytical tools to enhance sector planning and risk assessment - Implement new mechanisms to disseminate these assessments, DSS and tools to support enhance strategic planning in sectors that are dependent on the basins natural resources	
Energy	- Strengthen electricity utilities to improve their efficiency and financial viability - Strengthen sector strategic planning to include a greater emphasis on climate vulnerability and climate change risk by introducing: o Assessment of vulnerability of supply systems, including hydropower and the development of other renewable sources less sensitive to climate o Assessment of climate change impacts on demand o Expand off-grid expansion opportunities (potential for renewable energy) o Grid extension - Carbon finance opportunities	- Support the expansion and development of regional electricity grid interconnections - Scale up investment in electricity access and energy efficiency - Review the effects of climate variability and climate change on the reliability and capacity of existing and potential hydropower facilities and developments; - Accelerate expanded pre-investment studies of hydropower and other renewable sources for grid and off-grid electricity supply - Coordinate grid and off-grid electricity access planning with rural development and forestry sectors and SLM programs to support efforts to reduce fuel-wood harvesting and use
Transport	- Enhance the capacity of road and transport sector agencies in the area of strategic planning to identify and incorporate climate vulnerability into sector plans and project designs	- Review and revision of planning and design standards for river and stream crossing, and cross drainage, in regions with existing and potentially increased future flood hazard including increases in high intensity rainfall - Increase the use of flood, drought (greater access to network) and drainage risk mapping in sector planning in rural and urban areas - Introduce risk assessment into the selection of design standards including pavement type
Urban Development, Water Supply and Flood Management	- Enhance strategic supply planning capability of urban water supply utilities including climate vulnerability and risk assessment of water supply sources - Strengthen urban development planning based on improved flood and drainage hazard mapping	- Invest in infrastructure upgrading and improvement to mitigate and adjust to changing flood and drainage hazard patterns - Invest in urban services to reduce flood and drainage risks including housing relocation, reduced encroachment into flood hazard areas, secure solid water management
Health	- Develop/strengthen climate-related surveillance systems (as part of overall monitoring system) - Increase awareness of health related climate vulnerability and increase capacity to incorporate adaptation in to the health care system	- Invest in disease vector control systems - Invest in increased surveillance of existing and emerging threat areas affected by climate variability and climate change
Forestry, Biodiversity and Coastal Zone Management	- Strengthen capacity to monitor forest and biodiversity resources, evaluate their status and threats and formulate actions - Develop and test new governance arrangements for forest resources	- Invest in forest resource management to enhance climate resilience, enhance livelihoods of people living near and in forest areas, and promote resource conservation - Invest in reforestation and afforestation, and in their sustainable management - Invest in forest fire prevention, risk surveillance, and response

As can be seen, many of these investments to reduce climate risks involve faster sustainable development, careful assessment of vulnerability, strengthening institutional capacity, and re-orienting investments.