

**Eradicating Rural Poverty to Implement the 2030
Agenda for Sustainable Development**

**Climate change, Natural Disasters
and Rural Poverty in Ethiopia**

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Ethiopia's Vulnerability to Climate Change and Impacts

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- Ethiopia's Vulnerability to impact of Climate Change and variability
- Indicators of Climate change in Ethiopia
- Climate change induced disaster
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Ethiopia – Climate Change -Poverty

- Recent reports on vulnerability mapping confirmed Ethiopia's high vulnerability to climate change.
- It also has the least capacity to respond
- Studies argues that climate change will be a major challenge to the country's efforts towards achieving food security and sustainable exit from poverty
- From year to year estimates show that CC is reduce yields staple crop by 33%, further contributing to poverty in Ethiopia

Relatively High **Mortality** Risk from 2 or more Hazards

Country	% area at risk	% population
• Bangladesh	97.1	97.7
• Ethiopia	29.0	69.3
• United States	1.1	35.1
• Thailand	2.6	10.7
• 3 or more hazards: Comoros, Mozambique, Madagascar, Malawi...		

Climate Change Indicators

How does CC manifest?

Climate change manifest itself with

- Temperature increases,
- Changes in precipitation,
- Sea level rise, and
- The intensification of natural hazards, such as storms, floods, droughts, and landslides (IPCC, 2007)

Climate Change Indicators in Ethiopia

- Mean annual temperature has increased by 1°C, an average rate of 0.25°C per decade.
- For instance the mean annual temperature increased by 1.3°C from 1960 – 2006
- The average number of "hot" nights (the hottest 10 percent of nights annually) increased by 37.5 percent between 1960 and 2003, while the average number of hot days per year increased by 20 percent.
- More intense precipitation during extreme weather events, although long-term rainfall trends are difficult to determine.
- The incidence of drought increased.
- *Belg* rains are increasingly unpredictable

Prediction for the Future of Climate Variable

Future projections of temperature and rainfall patterns in Ethiopia exhibit a high degree of uncertainty, but most projections agree that:

- From 2006 – 2020 mean annual temperature is predicted to rise by +1.2 °C (range: 0.7 – 2.3°C), which is +0.4%
- By 2050, the mean annual temperature is projected to increase by +2.2 °C (range: 1.4 – 2.9°C), which is +1.1%.
- By 2090, the mean annual temperature is predicted to increase by +3.3 °C (range: 1.5 – 5.1°C) Wetter conditions
- The frequency of hot days and nights will substantially increase. About 15–29 percent of days will be considered hot by 2060.
- It is uncertain whether rainfall will increase or decrease; projections range from -25 to +30 percent by the 2050s.
- Increases in the proportion of total rainfall that falls in “heavy” events with annual increases of up to 18 percent.

Predicted Climate change induced Extreme Weather events

- Heavier rainfall events.
- Uncertain future El Nino behavior brings large uncertainties
- Flood and drought events likely to increase
- Heat waves and higher evaporation
- The occurrence of vector born diseases increase
- Water born diseases and frequency of incidences increase

Climate Change Induced Disasters

CC Induced Disasters in Ethiopia

- 2000-2001, in Africa 35 million (13%) of the total population were affected
- 1992, drought reduced Zimbabwe and Zambia's GDP by 9%
- 2000, the GDP of Mozambique dropped by 12% as a result of flood
- Ethiopia: Drought
 - 250BC
 - 9th cent to 1888-1892 = 13 drought years
 - 1892-1970 = 20 drought years
 - 1990-2005 = on average each year 6.3 Million people requires food assistance
- War
 - 1896 = the battle of Adwa
 - 1970 = Ethio-Somalian
 - 1998-2000 = Ethio-Eritrean
 - 2007-2008 = what is that

Some Instances...

– Epidemics

- From early 831AD
- 1888-1892 famine was caused by epidemics of livestock, rinderpest
- Malaria endemics in 70% of the country sometimes reaches critical
- HIV/AIDS

– Flood

- 1996
 - 2000
 - 2006
- in Somalia, Afar, Gambella, Oromiya and Amhara

Climate Change Induced Disaster

1. Drought

- Ethiopia is one of the world's most drought-prone countries.
- 9th Cen to 1888-1892 - 13 drought years were recorded
- 1992-1970 - 20 major drought seasons
- **1970-1980** every 3 years
- **2004 – 8million people**
- **2005 – 6.3 million People**
- **2008 – 11.6 million people**
- **2016 – Following the 2015/16 El nino Cricis about 18 million people needed food aid**

Climate Change Induced Disaster

2017 – due to the prolonged impact of drought,
During the first half of 2017

- 5.6 million people required food aid
- 2.7 children, pregnant and lactating mothers required supplementary feeding
- 9.2 million people required water
- 1.9 million people required livestock assistance
- 300,000 children required treatment of acute malnutrition

Climate Change Induced Disaster

- 2017 – during the second half of the 2017
- 8.5 million people required emergency food aid
 - 3.6 million children + pregnant + lactating mothers required supplementary feeding
 - 10.5 million failed to access regular water for drinking
 - 2.25 million people required livestock support
 - 376000 children required treatment of acute malnutrition

Climate Change Induced Disaster

- 2018 – during the 2018, about 3 million people were displaced because of conflict and drought

Climate Change Induced Disaster

2. Flood

S/N	Region	Vulnerable	Affected
1	Afar	28,000.00	4,600.00
2	SNNP	106,300.00	44,000.00
3	Amhara	47,100.00	47,100.00
4	Oromia	61,300.00	21,900.00
5	Tigray	122,300.00	2,600.00
6	Dira dawa	10,400.00	10,400.00
7	Somalia	87,000.00	43,200.00
8	Gambela	62,000.00	26,100.00
	Total	524,400.00	199,902.00

2006 Example



Climate Change Induced Disaster

2. Flood 2018

- Flash flood incidences since April have left hundreds of thousands of people in need of immediate humanitarian support in Afar (Awsii), Oromia (Arsi, East Shewa, East and West Hararge zones) and Somali (7 zones) regions
- Month of April In Somali region, more than **43,887** flood-affected households (**263,322** persons) need urgent food, water, health services and NFI support
- In Somali region alone **83** kebeles in **19** woredas (districts) of Afder, Fafan, Liben, Nogob, Siti, Shebele and warder Zones
-

Climate Change Induced Disaster

- Month of May in Somali region alone flooding affected more than 52,170 households (313,000 people), of whom 31,300 households are displaced
- In total, 25,238 households/151,428 people were displaced in Somali region
- According to the April 2018 DTM, **35** displacement incidents were reported during April alone displacing **170,760** people nationwide

Climate Change Induced Disaster

- In Somali floods destroyed **12,911** hectares of farmland and damaged **76** health facilities, mostly health posts.
- At least **123** schools were affected, interrupting schooling. The report also states that more than **15,643** houses were destroyed, requiring emergency shelter interventions
- In West Arsi Zone of Oromia region, **22** people killed, **7** injured, **53** people (**11** households) displaced,
- In Sidama and Gamo Gofa Zone of SNNPR, in May 2018, **32** people killed, **23** injured, more than **50,000** households were displaced

Climate Change Induced Disaster

3. Landslides

- A landslide on the outskirts of Ethiopia's capital killed more than 113 people and leaving several dozen missing in 2017
- In 2016 about 100 people have been killed and 20,000 families have been made homeless.
- Several 100s of livestock were drown
- During the same year 6 affected regions had fell in dangerous situation relating to food security

Climate Change Induced Disaster

4. Epidemic and Diseases

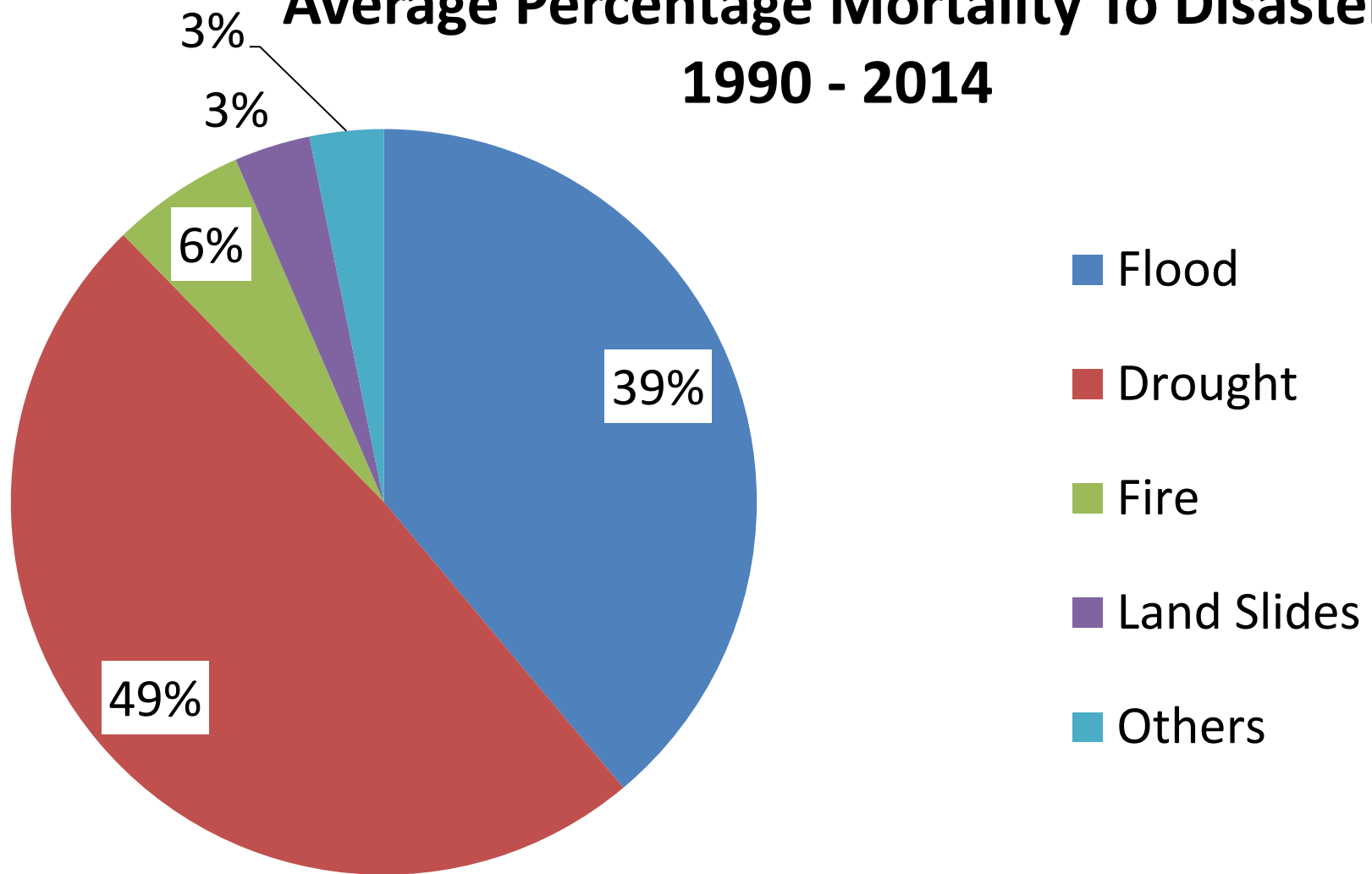
- 68% of Ethiopians are living in areas at risk of malaria
- lengthen the transmission period of major vector-borne diseases and alter geographic range.
- Malaria outbreak is now moving from lower altitude in Somali and Afar to higher altitude in Amhara and Tigray
- In 2006 widespread of Cholera caused illness and death of many people
- Outbreak of AWD lead to morbidity and mortality of hundreds of people following the flood situation

Climate Change Induced Disaster

- CC and Environmental change could be associated with Zoonoses than can be transmitted from animals to human and vis versa
- **75%** of infectious diseases in human have evolved from exposure to Zoonotic pathogens
- In low income countries like Ethiopia Zoonoses is responsible for the **1/5th** of infectious diseases
- Globally Ethiopia is marked as one of the hotspot for Zoonotic event
- Ethiopia is ranked **1st** for Leptospirosis, **4th** for Q fever and Trypanosomiasis and 10th for tuberculosis
- Ethiopia is the **4th** highest burden caused by Zoonosis

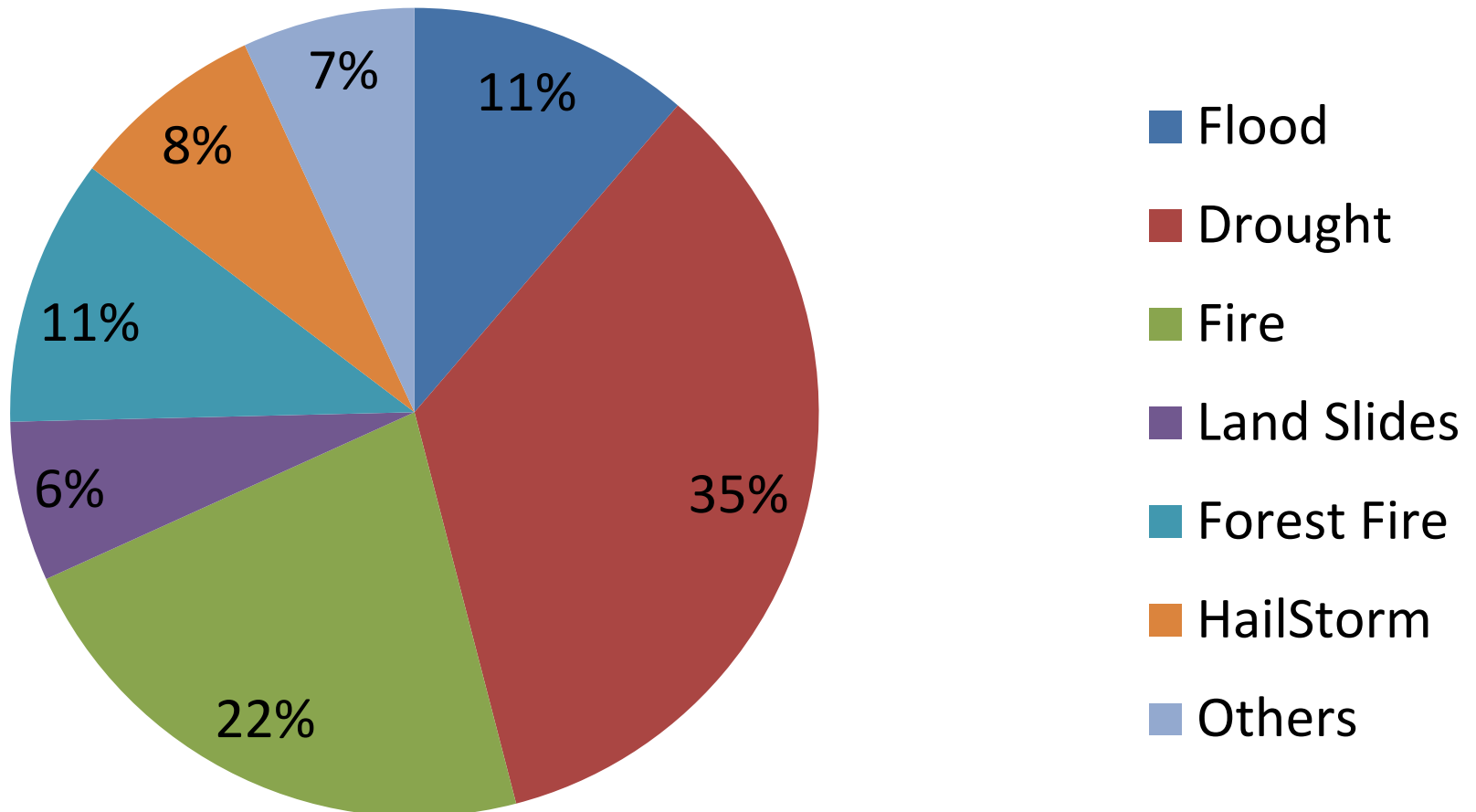
Climate Change Induced Disaster

**Average Percentage Mortality To Disaster
1990 - 2014**



Climate Change Induced Disasters

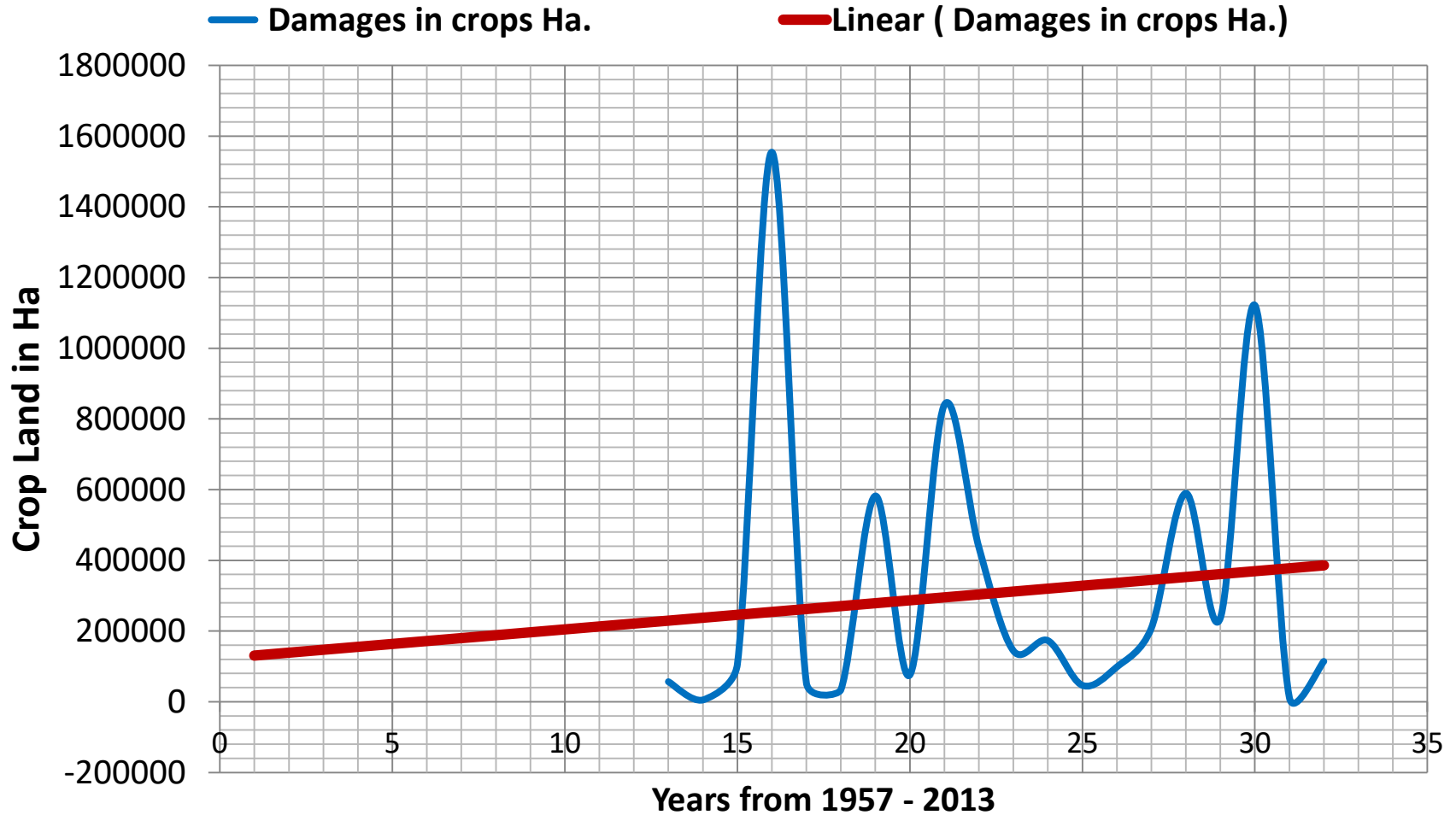
Economic Loss Yearly Average 1994 -2014



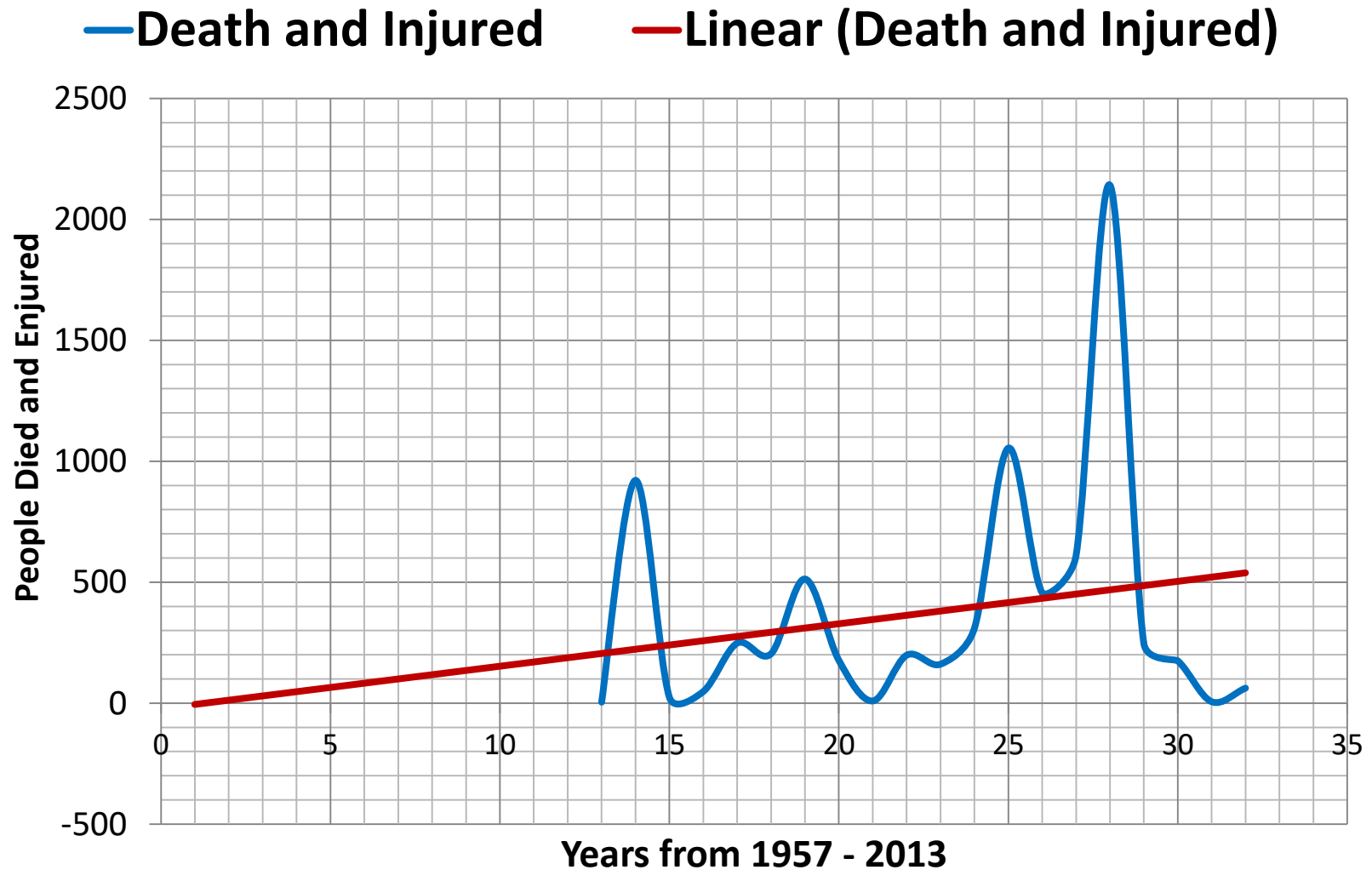
Damages Brought by Natural Disaster

8-year moving average 2005-2013	Figure
Deaths	318
House destroyed	197.6
House damaged	43.63
Injured people	47.75
Displaced people	121,785.50
Combined economic loss (US\$)	82,842,678.65

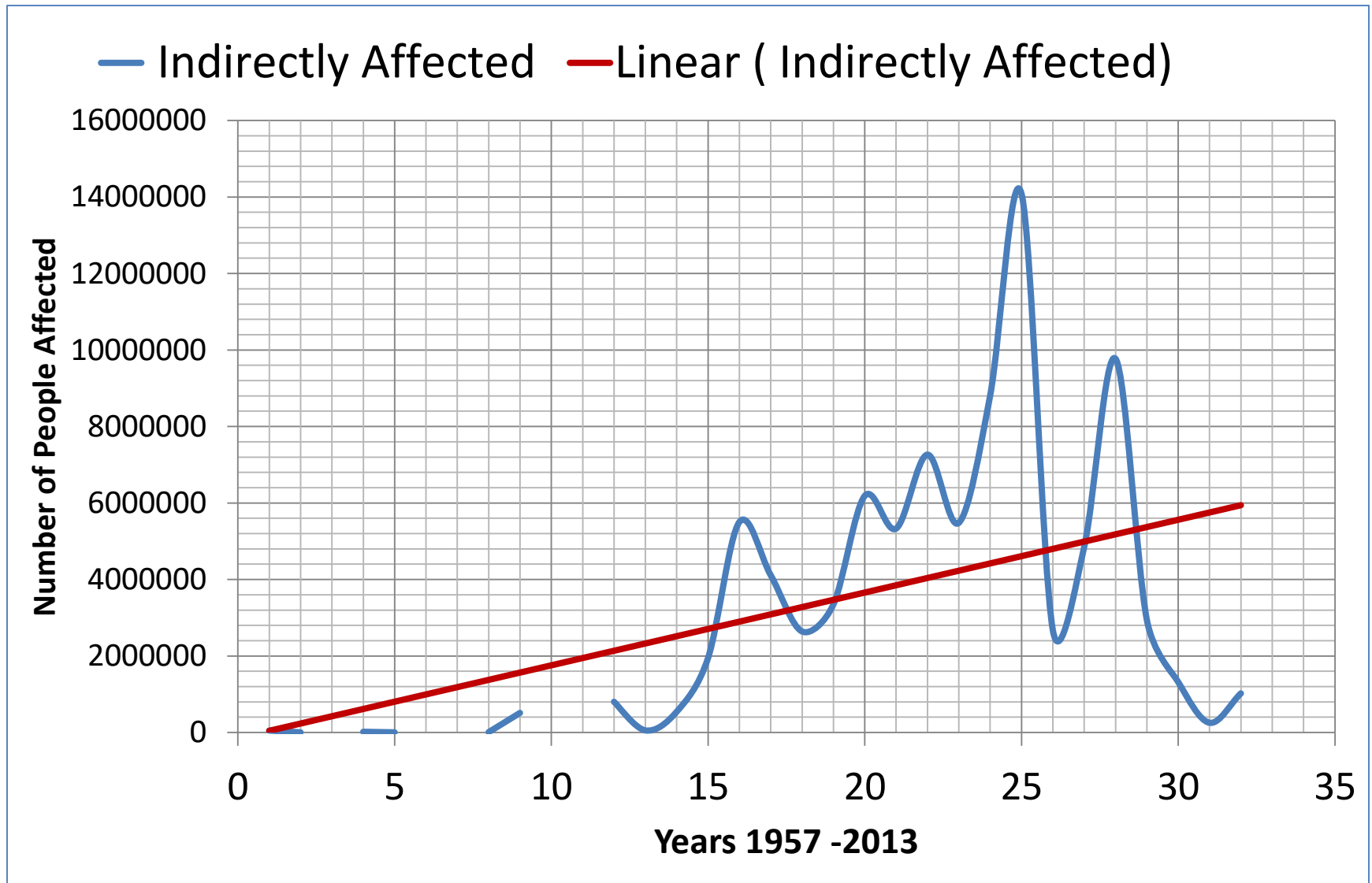
Cropland Damaged to Combined Hazard



People Injured and Died



People Affected



Climate Change Induced Disaster and Poverty

Impact of Climate Change Increasing Poverty

1. Malnutrition

- Climate change affected the nutrition condition of the country through various causal pathways that impacted food security, sanitation, water and food safety, health, maternal and child health care practices
- Under-nutrition linked to extreme climatic events has been one of the most deadly consequences of climate change in the country
- Ethiopia ranked the **4th** among the worst food insecure countries in the study conducted by FAO 2006 in selected African countries
- In Ethiopia one of the world's most drought-prone countries, children aged five or less are, **36%** more likely to be malnourished if their birth happens to be in a drought season
- Ethiopia remained one of the countries of the world with **highest rate of stunting**

Climate Change and rural Poverty

2. Reduced Crop Production as the Main Rural Livelihood

- > 94% of the cultivated land across Ethiopia is rain fed (the remaining include traditional irrigation)
- There is a general shortage of intensive technology for crop production
 - Fertilizer application rate with the largest 57kg/ha, as opposed to the recommended 200kg/ha
 - In a particular year about 96.5% is covered by local seed
 - The major crops grown are slow maturing, low yielding, long cycle, etc
 - The other chemicals for herbicides and pesticides is unavailable
 - Due to shortage of improved post harvest handling, post harvest loss is estimated to about 24% for some of the cereals
- Most plots are less than 0.5ha not sufficient to meet HH food demand
- Limited capacity of HH to invest in farming that could increase resilience

Climate Change and rural Poverty

That being the case

- Increased desertification leading to loss of arable land, which in turn brings high dependency on food aid (high heat stress, increased evapotranspiration, reduced soil moisture)
- Shifting agro ecological zones
- Increased incidence flood, landslides, increased soil erosion
- Altered growing cycle (delayed planting and early harvests)
- Increased incidence of pests and diseases (maize lethal necrosis, wheat rust and Faba bean leaf and stem gall)
- Consequently Ethiopia forgo more than **6%** of each year's agricultural output if the current decline in average annual rainfall level continues in the medium term

Climate Change and rural Poverty

3. Livestock Production

- Ethiopia's livestock sector, the largest in Africa relies heavily on climate sensitive resources
- The customary rangeland management practiced by the country's 10-15 million pastoralists in over 60% of the country depend on limited water and forage availability that is increasingly affected by drought
- The available improved technology for livestock is limited
- The veterinary service provision is extremely limited
- Due to the ongoing reduction in the availability of open space for grazing, herd size is decreasing

Climate Change and rural Poverty

This being the existing context

- The increased temperature, increased unreliability of rain, especially Belg, recurrent drought are bringing the following impacts
 - Reduction in water availability and feed resources for livestock, leading to lower productivity and higher susceptibility to disease;
 - Increased incidence of heat stress, higher mortality rates
 - Increased conflict over limited water and feed resources
 - Loss of grazing land
 - Deteriorated livestock health conditions
 - Forced migration exacerbating tension over resources
 - Loss of livestock-dependent livelihoods, it became common in recent years to find pastoralists without livestock
- Loss of livelihoods and forced migration are also concerns, as crop and livestock mortality are expected to decrease incomes by 19–30 percent

Climate Change and rural Poverty

4. Human Health

- Ethiopia has a high incidence of climate-sensitive diseases.
- Roughly 70% of the population lives in malaria-endemic areas and outbreaks that occur every 5 to 8 years account for up to 20% of deaths for children under the age of 5
- Increased temperatures will likely expand the range of malaria to highland areas and increased flooding will facilitate the spread of waterborne diseases like diarrhea.
- Aggravation of respiratory diseases caused by allergens and air pollution
- Increased incidence of waterborne illnesses, such as diarrhea, cholera and dysentery

Climate Change and rural Poverty

Human Health

- More than **70,000** deaths annually are tied to indoor and outdoor air pollutants, which a hotter, more drought-prone climate will aggravate
- Evidence suggests that children born during a drought are 36 percent more vulnerable to diseases and malnourishment
- The whole of loss in human life and health condition result in reduced productivity, increase health expenditure and deepening HH poverty

Climate change and Rural Poverty

In Summary

- The country faces numerous development challenges that exacerbate its vulnerability to climate change including high levels of food insecurity
- Chronic food insecurity affects 10 percent of the population, even in years with sufficient rains
- Roughly two-thirds of the population earns less than \$2 per day and access to basic services is limited
- Rain fed agriculture contributes nearly half of national GDP and is the mainstay of livelihoods for 85 percent of the population
- The rural livelihood systems – crop cultivation, pastoralism and agro-pastoralism – are highly sensitive to climate

Climate change and Rural Poverty

- Food insecurity patterns are linked to seasonal rainfall patterns, with hunger trends declining significantly after the rainy seasons
- Climate variability already negatively impacts livelihoods and this is likely to continue
- Drought is the single most destructive climate-related natural hazard in Ethiopia
- Estimates suggest climate change may happen to be the major one to reduce Ethiopia's GDP by 2045 primarily through impacts on agricultural productivity

The how CC aggravates Rural Poverty

- **Crop Production:** Reduced yields and/or crop failure Reduced soil moisture availability; increased evapotranspiration and water stress
- **Livestock:** Increased incidence of pests and diseases Reduced feed and water sources Increased livestock mortality
- **Human Health:** Changing ranges of vector-borne diseases Increased risk from waterborne diseases
- **Water:** Reduced water quality and quantity Drying of wetlands and freshwater sources Disruption of hydropower generation

Why Climate Change Remained Aggravating Rural Poverty and the What to Do?

What are the Major Prevailing Gaps

- Some of the Climate change-related outcomes have not been sufficiently studied in Ethiopia to guide the development and implementation of adaptation and mitigation strategies
- There are many actors on climate change, natural disasters and poverty alleviation in Ethiopia, however, there is a general lack of inter-sectoral collaboration among the organizations that works on climate change-related activities
 - For instance the connection between the National Meteorology Agency, the Ministry of Health, and the Ministry of Agriculture and academic and research institutes has been found inadequate
 - A number of governmental and non-governmental organizations are working on climate change adaptation and mitigation activities, but their activities are not properly coordinated
 - Multidisciplinary approaches among the professionals of health, agriculture, climate, and water resources are weak

What are the Major Prevailing Gaps

- At a micro level in many of the locations across Ethiopia there are pressure that has been brought by private sectors, However, the involvement of the private sector in the endeavors of climate change is highly limited.
- There is a lack of research capacity among experts, and equipment limitations to carry out research linked to climate change
- There is a lack of baseline data on basic climate change indicators, e.g., carbon release of the industrial sector
- There is no specific training that may enhance the research activities, e.g., climate change modeling and longitudinal data analysis, are lacking

What are the Major Prevailing Gaps

- There is a serious lack of technologies that fit the local setting as well as a shortage of capital to adapt existing technologies
- Financial capital has been identified as a constraint. This is particularly a challenge for the Ministry of Environment, Forest and Climate Change (MEF) to implement and realize plans and strategies
- The policies and the strategies are adapted mainly from international evidence and not from findings related to the local climate change and health

Thank You