

INTER-AGENCY REGIONAL ANALYSTS NETWORK

AN ACF AND IRIS INITIATIVE

2015/16 El Nino Event

October 2015

Global Report



This report is designed to give an overview of the impact of the current El Nino episode on the most affected areas in East Africa, Southern Africa, Asia and to a lesser extent West Africa. It highlights most affected countries within ACFIN's portfolio¹ and provides, where possible, the likely impacts by sector.

The high level of uncertainty surrounding weather phenomena and El Nino in particular makes scenarios too imprecise however, the predictions of the World Food Programme outlined in the 2015 El Nino Scenarios² are used as a starting point for this report as they reflect the most current forecast (see Annex 1). This report complements the WFP outlook with an analysis of the vulnerability of the affected countries. Included in the report after the discussion on the global phenomenon, the 2015/2016 El Nino event, the likely impacts for rainfall, agriculture and health and the resilience of affected countries there is a regional breakdown followed by a more detailed look at the projection and impact by country.

Affected countries in ACFIN portfolio detailed in the report³:



WHAT IS EL NINO?

El Nino⁴ is one of the most known models of climate variability and is associated with climate anomalies throughout the globe. El Nino episodes cause major global weather and climate fluctuations and influence

¹ South America is not included

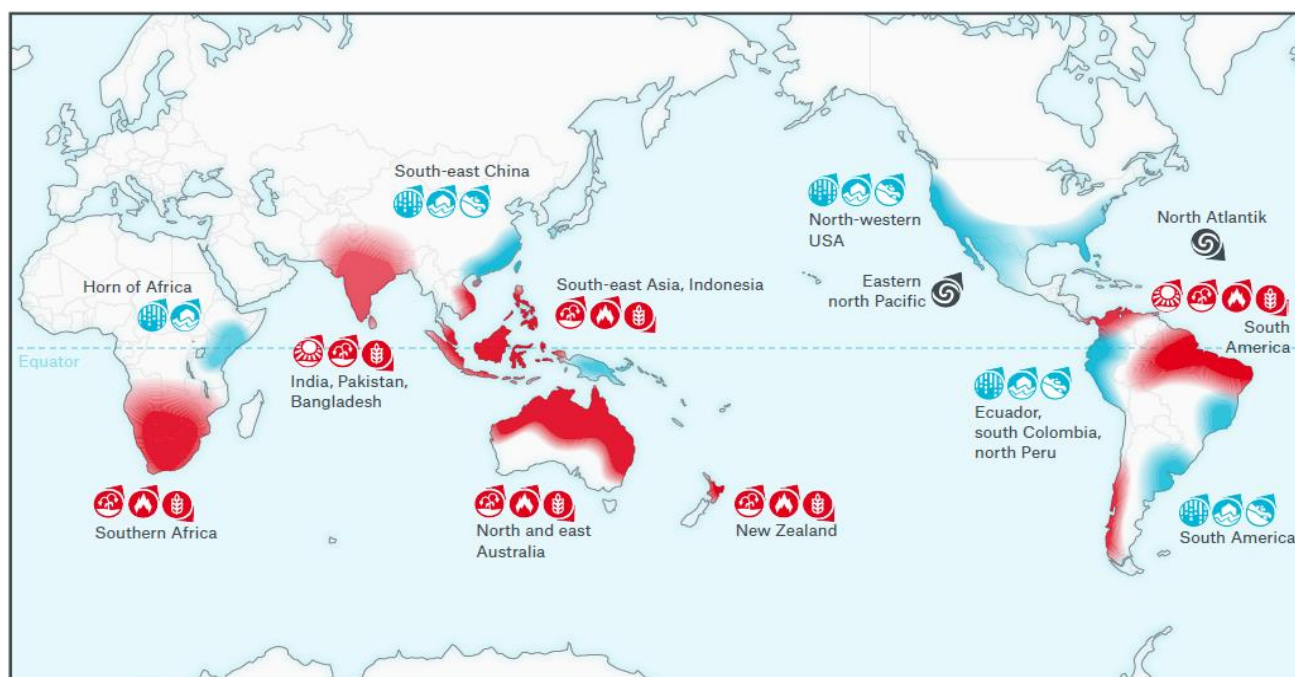
² World Food Programme (2015). El Nino: Implications and Scenarios for 2015

³ Djibouti, Ethiopia, Somalia, Kenya, Uganda, Zimbabwe, Madagascar, India, Indonesia and the Philippines

⁴ The Southern Oscillation (ENSO) cycle consists of opposing El Nino and La Nina phases, El Nino is known as the warming phase and La Nina the cooling period. The El Nino is a periodic phenomenon that occurs every two to seven years and typically last for 9-18 months. It generally evolves during April until June reaching its maximum strength between December and February. An El Nino episode is defined by anomalies in the sea surface temperature (SST), which are higher than average during the event and changes in wind and rainfall patterns are recorded. During normal weather conditions, trade winds blow towards the west resulting in warm water to culminate in the western Pacific Ocean and cold water to culminate in the eastern Pacific. Conversely, during El Nino, these trade winds fade in the central and western Pacific Ocean causing warmer water to culminate in the eastern Pacific Ocean. The rainfall follows this warmer water eastwards, resulting in a decline in rainfall in the western Pacific. The deviation in the

patterns of temperature and precipitation, inducing events such as flooding, droughts and cyclones. As a result, El Nino events often have severe socio-economic impacts including loss of life, displacement, damage to property and infrastructure, food insecurity, outbreak of diseases as well as water shortages. In 1997/98 an estimated 24,120 people lost their lives as a consequence of the El Nino causing cyclones, floods or storm tides. The damage caused by the 97 El Nino globally amounted to 34.4 billion US dollars.

23 El Nino episodes have been recorded since 1950; six of these were categorized as strong events. The most severe El Nino occurred in 1997/98 and is referred to as the climate event of the century. The most prolonged phenomenon was recorded between 1986 and 1988, when two consecutive warm events influenced the climate for 19 months. Some analysts argue that climate change is likely to increase the frequency of El Nino causing more severe impacts, but this hypothesis is contested.



Source: Munich RE. El Nino and its global effects

Though the study of El Nino has received increasing attention over the last decade, forecasting the intensity and the exact impact of the phenomenon remains difficult and models are hypothetical. The difficulties in assessing the individual impact of El Nino episodes is caused by the absence of a deterministic trend as the event only intensifies existing weather patterns but does not cause them. Furthermore, while there is a general correlation between the impact of an El Nino event and its intensity, the potential for an event to generate serious impacts in some regions irrespective of its intensity remains. Likewise, El Nino is not the only factor influencing climate patterns during the episode, but at the regional level, seasonal outlooks need to assess the relative impacts of both the El Nino state and other locally relevant climate drivers. For example, the state of the Indian Ocean Dipole, or the Tropical Atlantic SST Dipole, and the Pacific Decadal Oscillation may impact the climate during the El Nino occurrence.⁵

water surface temperatures reaches its peak around Christmas. In contrast, during La Nina events, the sea surface temperatures in the same basin declines. In general, most of El Nino events are followed by La Nina events⁴. UNOCHA, What is an El Nino Event

⁵ World Meteorological Organization (01.09.2015). El Nino/La Nina Update

Summary of El Nino

El Nino is the warm phase of the El Nino Southern Oscillation and is associated with warm ocean water that develops in the central and east-central equatorial Pacific

The ENSO cycle, El Nino and La Nina, cause global changes of both temperatures and rainfall

El Nino and La Nina events tend to develop during April and June and reach their maximum strength during December to February

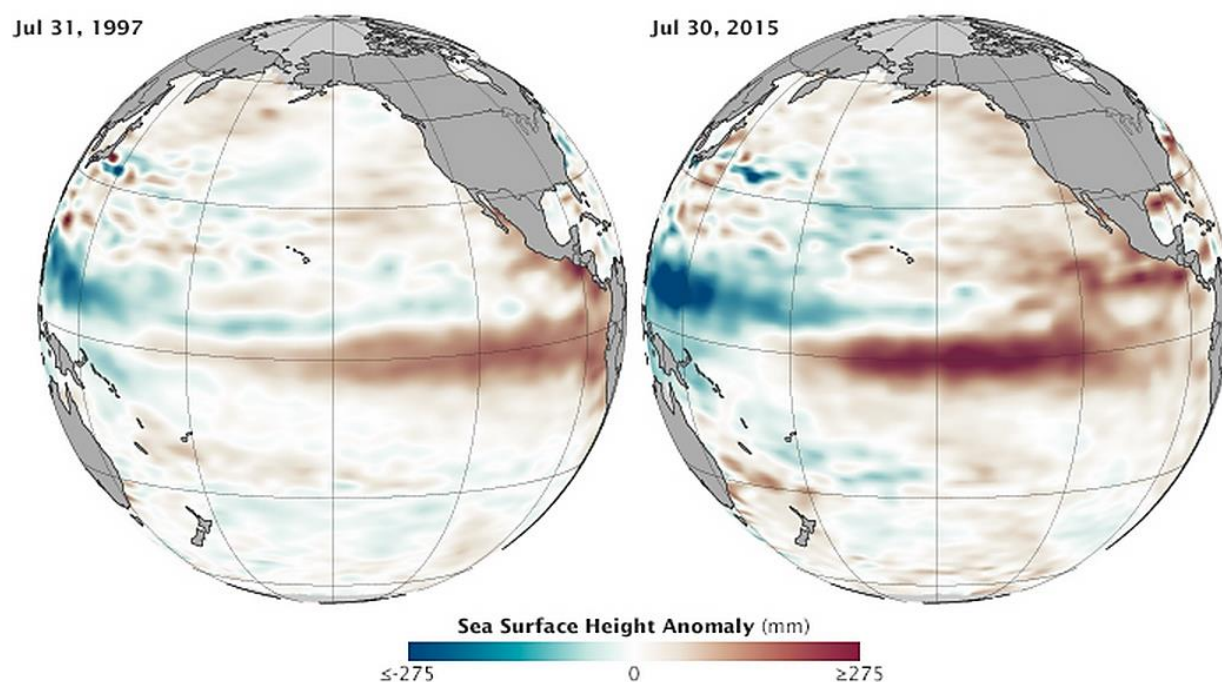
El Nino typically persist for 9-18 months

It generally recurs every 2 to 7 years

The strongest El Nino was recorded in 1997/98

THE 2015 EL NINO CYCLE

An El Nino event is officially active since March 2015. After remaining at relatively weak levels until May 2015 it is now significantly intensifying and should reach its maximum strength in the last quarter of this year. While the intensity and impact of the El Nino is difficult to forecast, several indicators suggest that the developing episode is anticipated to be a strong event. According to the US National Oceanographic and Atmospheric Administration (NOAA) and the UK Met Office, the 2015 El Nino is likely to be up to the strongest since records began in 1950, while more moderate estimates place the El Nino among the four strongest events to have occurred since 1950.



Source: NASA. [Sea Surface Height Anomaly](#)

The majority of climate outlook models suggest that the 2015/16 El Nino is likely to strengthen further before the end of the year. There is a greater than 90 percent chance that the current episode will continue through the Northern Hemisphere winter 2015/16, and around an 85 percent chance that it will last into

early spring 2016. Currently, El-Nino related climate alterations are of concern especially in Southern Asia, Latin America, East and to a lesser extent in West Africa.

Highlights: 2015 El Nino

As of August 2015, both the ocean and atmosphere over the tropical Pacific exhibit behaviour indicative of a strong El Nino event

A majority of the models surveyed and expert opinions suggest the 2015/16 El Nino will strengthen further during the second half of 2015

The peak strength of this El Nino, expected sometime during October 2015 to January 2016, could potentially place it among the four strongest El Nino events since 1950

Impacts of the current El Nino are already evident in some regions and will be more apparent for at least the next 4 to 8 months⁶

WHAT IS THE IMPACT OF EL NINO?

While the consequences of the El Nino can be witnessed around the globe, the impact is particularly severe among vulnerable communities, who have limited resilience to natural hazards. During previous El Nino episodes heavy rains causing flooding and landslides resulted in death, loss of property, damage to crops as well as the destruction of infrastructure. In addition, water related diseases, such as cholera and malaria, increased dramatically in flood affected areas in East Africa, Latin America and Asia⁷. The impact is exacerbated by conflict as well as population growth, rapid urbanization, climate change and land degradation. Moreover, the effects of El Nino are likely more severe in communities where food insecurity is already prevalent and populations suffer from the cumulative effects of past poor growing seasons⁸.

During previous episodes El Nino had the most significant impact on water, agriculture and health sectors. Nevertheless, the relationship between El Nino and the various sectors is complex and the correlation varies. While studies highlight that water and the phenomenon have the most direct correlation, more complex correlations exist between health and climate.

1. El Nino Impact: Precipitation

Only 20-30 percent of the global surface is likely to experience higher or lower precipitation due to ENSO, with the majority of the regions located in the tropical spheres. El Nino is typically associated with below average rainfall and La Nina with above average precipitation. Nevertheless, there are geographical differences in the impact witnessed by El Nino globally, for example the event causes high precipitations from December until February in South Brazil, but lower than average rainfall in central Indonesia, the southern Philippines and below than average precipitation in wide parts of south America and southern Africa. During June until August there are abnormal high rainfalls in parts of North America, but lower than average rainfalls in India and Pakistan. The ENSO can potentially impact the strength of hydrological extremes, leading to extreme rainfalls, flooding and droughts. Typically droughts and flooding have a high correlation with the intensity of El Nino events.

2. El Nino Impact: Agriculture

⁶ World Meteorological Organization (01.09.2015). El Nino/La Nina Update

⁷ CARE (1998). El Nino in 1997-1998: Impacts and CARE's Response

⁸ World Food Programme (18.08.2015). 10 Facts about El Nino.

El Nino has a significant impact on the climate susceptible agriculture; however the extent of the impact is hard to measure as a multitude of variables have to be taken into account⁹. Although the relationship between El Nino and agriculture is complex, the possible impact of an episode will depend on its intensity, duration as well as the sensitivity of crops during the peak period of impact and the preparedness and adaptability of farmers. In general ENSO influences the production and harvest on rain-fed cropland, where there is an evident correlation between precipitation and ENSO, such as in India, Sri Lanka, South East Asia, Mexico and Zimbabwe. In dry farming conditions the impact on the crops is dependent on the rainfall during El Nino episodes and is the strongest in drought prone areas. Moreover, the intensity of the El Nino does sometimes not defy the impact, for example the El Nino in 1991/92 caused drought in approximately 350 million hectares while the El Nino 1997/98 affected 80 million hectares (77 percent less), although the latter one was considered as substantially stronger event.

Furthermore, El Nino's impact on the harvest is also largely dependent on the sensitivity of the crops during the event. Annual crops planted in October-November in the southern hemisphere have a lower probability of being affected during an episode, because planting occurs in the previous year and harvesting takes place in March-April, normally before the declaration of El Nino¹⁰.

El Nino is likely to impact the harvest by either higher than average rainfall or dryness, hence it can impact food security due to a reduction in agricultural production¹¹.

El Nino impacts on food production in 2015

The dynamics of the El Nino phenomenon can be highly variable even within the same sub-region. However, in 2015 the main areas of concern, Southern Asia and East Africa are likely to be highly affected by the phenomena as in many parts of those regions the main cropping season has just begun, and hence the harvest is very vulnerable. In particular, rain-fed paddy production in South and Southeast Asia could be affected by below-average precipitation. Similarly, dry weather conditions may affect the harvest in Southern Africa. By contrast, the Horn of Africa may experience above average rainfall resulting in higher agricultural outputs in some areas and the destruction of the crops in others. Above-average rains at the end of the year may also affect planting operations in major cereal growing areas of Argentina, southern Brazil and Uruguay⁹.

3. El Nino Impact: Health

The relationship between climate and health is complex, but several outbreaks of diseases have been recorded as a result of El Nino. Especially in tropical spheres many communicable diseases intensify during or in the aftermath of flooding or drought caused by El Nino. An increase in vector-borne diseases is witnessed during El Nino events including dengue, chikungunya and zika virus due to favourable conditions enhancing reproduction and transmission¹³. WHO studies have demonstrated a correlation between El Nino and dengue activity, especially in regions where the event has a strong effect on the weather, such as in Indonesia¹⁴. Several countries in Asia experienced an unusually high level of dengue infections during the 1997/98 El Nino, which may be attributable to El Nino-related weather. Furthermore, in Africa and Latin America several outbreaks of malaria have occurred through El Nino episodes, as Malaria transmission is particularly sensitive to climate deviations. There was a four-fold increase of malaria in Sri Lanka during El Nino episodes. In Colombia, there was a 17.3 percent surge during El Nino and a 35.1 increase in all reported Malaria cases in the post-Nino year. Changes in rainfall as well as higher temperatures caused by El Nino are

⁹ Food and Agricultural Organization (2014) Understanding drought impact of El Nino on the global agricultural areas

¹⁰ Food and Agricultural Organization (2014) Understanding drought impact of El Nino on the global agricultural areas

¹¹ Food and Agricultural Organization (2014) Understanding drought impact of El Nino on the global agricultural areas

¹² Food and Agricultural Organization (04. 06.2015) El Nino Southern Oscillation (ENSO) Possible impact on agricultural production during the second half of 2015

¹³ United Nations (14.09.2015) Pacific Prepares for Strengthening of El Nino

¹⁴ World Health Organization (1999) El Nino and Health

assumed to be responsible for higher malaria transmission¹⁵. Besides, while the exact causes for this remain disputed, even drought conditions caused by El Nino have a proven impact on the rise of Malaria, mainly assumed to be related to the higher vulnerability of a malnourished population.

Moreover, floods and droughts contribute to a number of diseases such as diarrhoea, leptospirosis, typhoid, by exposure to contaminated water or poor hygiene due to water shortages. Water-borne diseases are frequently reported during El Nino episodes, as high precipitation is an important factor in the contamination of surface water with sewage or slurry. However, drought conditions can also lead to hygiene-related diseases and the increased concentration of pathogens in surface water. Studies suggest that El Nino is linked with cyclical occurrence of cholera epidemics¹⁶.

The impact of the El Nino on health is also determined by other factors such as the extent of the vulnerability of the affected population defined by conflict, food insecurity, population density and non-existing health services. Moreover, the public health infrastructures are often damaged during natural hazards caused by El Nino, hence limited services are available. In Peru nearly 10 percent of all health facilities were damaged during the 1997/98 El Nino. In addition, power cuts due to poor electricity systems often leave medical supplies unusable and medical procedures cannot be performed further aggravating the spread of disease especially in regions without an effective public health infrastructure.

The current El Nino is likely to have a substantial impact on the affected countries as population growth, population density and rapid urbanization are leaving Asia and Sub-Saharan Africa increasingly vulnerable to natural hazards.

RESILIENCE

Natural hazards have a significant impact on affected communities and pose a substantial risk to development progress¹⁷. In order to assess the impact of the current El Nino on the affected population, special attention has to be placed on the resilience capabilities of the individuals, communities and countries. While El Nino affects developed nations such as the United States and Australia, the impact and consequences of the event are typically more severe in developing states. Though the cost of damages caused by natural disasters is much higher in developed countries, the impact of disasters is more severe in less developed countries as low household incomes leave the population with limited capacity to mitigate the effects of natural hazards¹⁸. This is especially true for those who are subjected to recurrent or composite disasters as their resilience is lowered over time making them increasingly vulnerable.

Poverty and Fragility

Poverty is a key determinant of a nation's ability to weather, mitigate and recover from a disaster. In addition to communities in the developing world being more susceptible to immediate impacts of natural disasters they also suffer from longer-term consequences such as entrenched poverty, disease, a reduction in education and employment opportunities, and malnourishment. El Nino typically affects rural areas more than urban centers and, in developing countries, rural areas generally have higher poverty levels than cities making these communities ever more vulnerable. Even in urban centers the most disaster prone areas are generally informal settlements, hence disasters are more likely to impact on the poorer population as lack of urban planning and disaster management has resulted in people settling in disaster-prone areas (such as flood zones) leaving them more vulnerable.

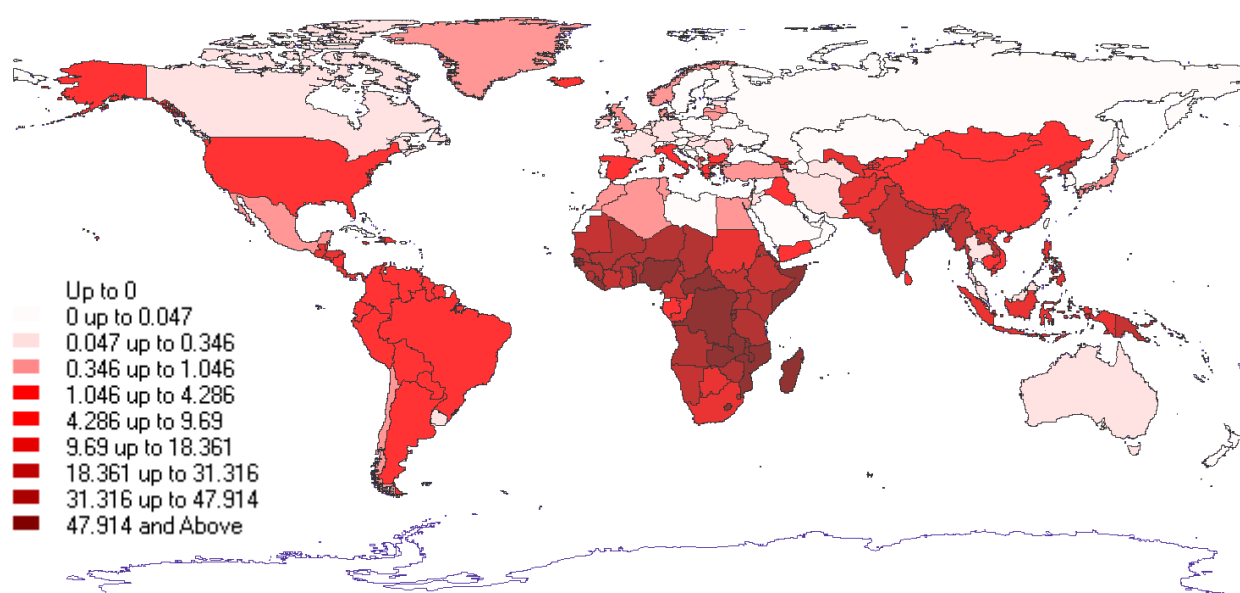
¹⁵ World Health Organization (1999) El Nino and Health

¹⁶ World Health Organization (1999) El Nino and Health

¹⁷ Natural disaster affected people through: death and disability, sudden loss of income, diminution of assets, destruction of infrastructure and macroeconomic shocks. The United Nations Development Programme (2008). Human Development Report 2007/08

¹⁸ Clark et al in Arouri, M. (2015) Natural Disasters, Household Welfare, and Resilience: Evidence from Rural Vietnam

Percentage of population living on less than \$1.25 per day PPP¹⁹



Source: International Futures

In addition, households that are just above the poverty line are also at high risk to fall back into poverty after an El Nino event, as they are highly vulnerable to climate shocks. This cohort constitutes 75 percent of people living in developing countries – around four billion people - living on less than \$4 a day who are exposed to natural hazards²⁰.

Households with lower incomes are unable to compensate damages or economic losses during disasters and often have limited mitigating systems in place. El Nino is likely to affect some of the poorest countries in the world (see map above) and as a result communities' ability to manage the consequences of it are likely to be limited. In the long-term poverty caused by disaster is an increasing risk²¹ creating a vicious circle of vulnerability.

Fragility and Disasters

In addition to poverty, state fragility can be a key indicator of resilience. Many fragile states fall within El Nino highly affected areas and a combination of natural disasters, poverty and fragility dramatically increase their risk profile. Compounding this vulnerability, humanitarian access in fragile states is often difficult due to the presence of armed groups and ongoing fighting. This is aggravated by weak or absent government structures unable to even provide basic disaster relief or invest in preparedness. An estimated 50 percent of people affected by natural disasters between 2005 and 2009 lived in fragile states²². States like South Sudan and Somalia are especially vulnerable to the current El Nino episode and even a minor event could have significant impact on the country, as high levels of poverty paired with a high risk profile and limited humanitarian access prevail²³. Moreover, conflict can increase disaster risk by displacing people into environmentally fragile areas that are more exposed to hazards and often areas with limited humanitarian access.

Resilience of Countries

¹⁹ The International Futures (IFs) modeling system, version 7.14

²⁰ World Bank, 2013

²¹ Overseas Development Institute (2013). The geography of poverty, disasters and climate extremes in 2030

²² Overseas Development Institute (2013). When disasters and conflicts collide Improving links between disaster resilience and conflict prevention

²³ Overseas Development Institute (2013) *When disasters and conflicts collide Improving links between disaster resilience and conflict prevention*

Building on the poverty and fragility elements of resilience, factors such as climate change, rapid urbanization, food price fluctuations, and economic stocks all contribute to determining the resilience capabilities of a country. A state's adaptability and its capacity to manage a disaster is another pillar in considering resilience. National early warning systems, governmental interventions, and international funding will contribute to reduce the impact of the current El Nino, however, this is only applicable to the extent that they are implemented and accessible to affected communities. The adaptive capacity of countries can be difficult to measure as it is a function of so many variables however by amalgamating different indices an accurate picture of the risk management of countries can be illustrated.

Disaster risk management and adaptive capacity by country²⁴

Country	Composite Assessment Score (0 being worst, 5 being best)
Somalia	0.8
Chad	1.7
Niger	2.2
Zimbabwe	2.5
Ethiopia	2.6
Madagascar	2.8
Mali	2.8
Kenya	2.9
Uganda	2.9
Burkina Faso	3.2
India	3.3
Philippines	3.3
Indonesia	3.5
Thailand	3.8

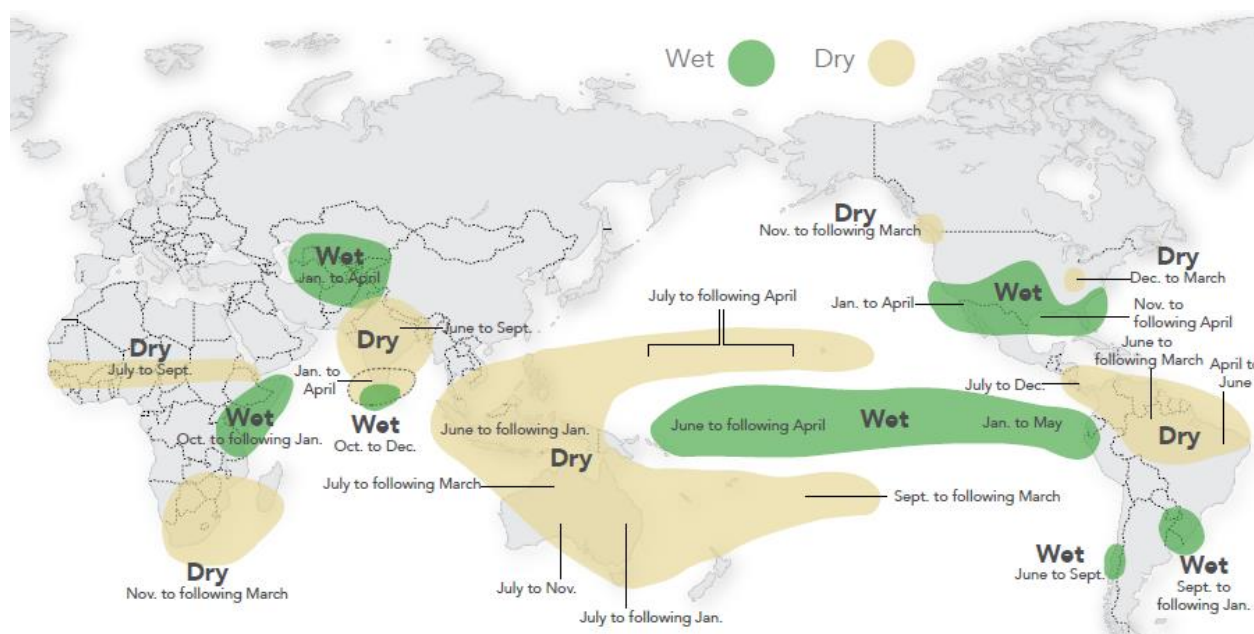
The adaptive capacity of countries affected by El Nino is variable, however, of the most affected countries it is evident that Somalia (and likely South Sudan though data is not available) will be the least able to mitigate the impact of the phenomenon. Though India, the Philippines, Indonesia and Thailand are all forecasted to be affected by the El Nino event, their overall level of resilience (including poverty and fragility) is significantly greater than affected states in Africa.

Mapping the combination of poverty, fragility and limited state capacity to manage disasters highlight the countries that are the most susceptible to shocks. By considering these components alongside the states most likely affected by El Nino in 2015 it is clear that the lack of resilience and preparedness could dramatically increase the consequences for states in East and Southern Africa including Somalia, South Sudan, Kenya, Zimbabwe and Madagascar as well as India due to its high level of poverty.

EL NINO IMPACT ON THE REGIONS

There is no deterministic trend for El Nino as every episode varies and influences climate patterns differently. Not all impacts occur during one El Nino episode or impact necessarily areas that have been highlighted. Therefore, this section should not be seen as a forecast of areas that will most certainly be affected, but an attempt to highlight areas that are likely to be affected based on historical experiences.

²⁴ Shephard et. al (2013) *The geography of poverty, disasters and climate extremes in 2030*, Overseas Development Institute pg. 47. The composite assessment score based on the normalization of three different indices: HFA Monitor Combined Score, World Risks Index Lack of Adaptive Capacity, Gain Readiness Score Index (keeping the basic scale and then averaging). A selection of countries were taken.



Source: NOAA. [Global Impact of El Nino](#)

Africa

In Africa the most negatively affected sub-regions by El Niño are presumed to be East and Southern Africa. West Africa, on the other hand, might actually benefit from the phenomenon creating above average rainfall in the region. Though a moderate El Niño was observed in the region from July to August 2015, most forecasts predict that it will continue until the beginning of 2016 with a stronger intensity.

The expected timeframe of El Niño is forecasted to influence the Horn of Africa by late 2015 and of Southern Africa from late 2015 to early 2016. Sub-Saharan Africa remains particularly vulnerable to climate related disasters and predominantly cyclones and storms, floods, landslides, and droughts. Drought and floods together account for 80 percent of loss of life and 70 percent of economic losses linked to natural hazards in Sub-Saharan Africa²⁵. As El Niño strengthens existing climate patterns floods and drought are likely to occur in Africa during the current episode and above average rainfall has been predicted for parts of East Africa, while Southern Africa is forecasted to be experiencing drought condition. Although government efforts supported by INGOs have increased disaster preparedness measures, especially after the disastrous effects of the 1997/98 El Niño, preparedness remain weak and unlikely to be able to cope with El Niño consequences.

In West Africa, the biggest concerns regarding El Niño are rainfall deficits and their impact on agro-pastoralism, especially in areas where food insecurity is already a major issue. However, the present situation and latest forecasts are optimistic. The Tropical North Atlantic SSTs have been near to above average at the West African coast from June to August 2015 and these favourable conditions in the region are projected to continue to the end of 2015²⁶. The current El Niño episode is unlikely to have a strong impact across the whole of West Africa with the exception of some localised, sparsely populated areas that could be impacted. The most recent analysis concludes that agro-pastoral outlooks are generally positive throughout the region except the late start of the rainy season. However, the variability of El Niño impacts over time and space and as a result caution should be exercised in being optimistic about the potential El Niño impact in West Africa.

²⁵ The World Bank (2010). Report on the status of Disaster Risk Reduction in Sub-Saharan Africa

²⁶ ACMAD Regional Climate Outlook Forum March 2015

Conflicts, exponential population growth, poor food security, limited access and weak or absence governance structures leave communities in Africa particularly vulnerable to the El Nino impacts. Even within the continent, areas that are forecasted to be affected by the El Nino are also the most vulnerable ones, where very low levels of resilience can turn even a minor weather related shock into a disaster. Humanitarian funding continues to be primarily focused on emergency responses so few sustainable programs have been implemented in disaster preparedness and mitigation.

El Nino Impact on East Africa

El Nino episodes tend to have a significant impact on East Africa, causing above average rainfall in some areas and rainfall deficits in other regions resulting in poor vegetation. According to the most recent forecasts: Kenya, Uganda, and southern parts of Somalia are likely to receive high precipitation and torrential rains, which are expected to occur between September and December but might extend to February 2016 in some parts of the region²⁷. Contrarily, Djibouti, Eritrea, northern parts of Sudan, southern parts of Tanzania, and north Somalia are forecasted to expect below normal rainfall. Therefore, parts of the region are expected to experience severe flooding while other areas are likely to experience drought conditions.

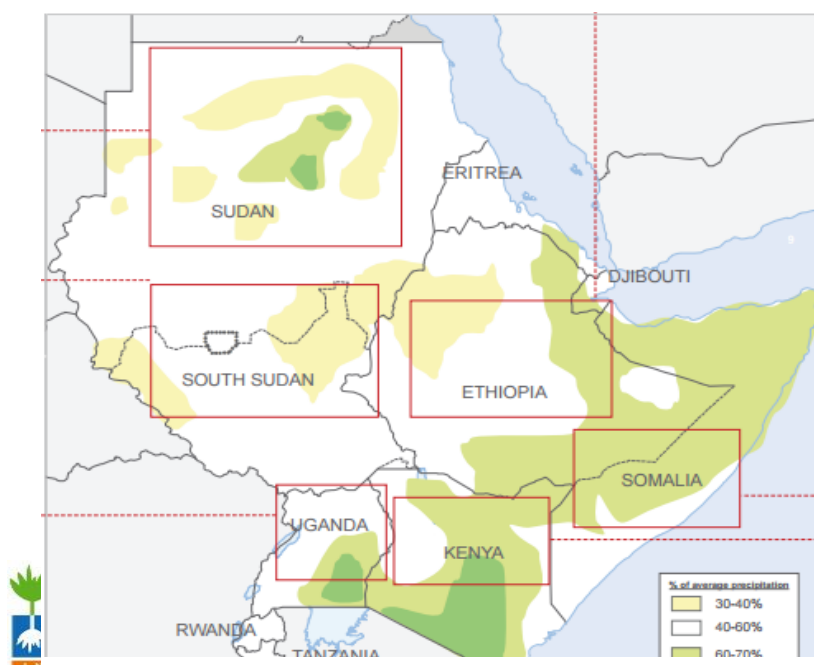
The intensified climate patterns impact on the harvest and the wider food security in the region. East Africa is largely dependent on rain-fed agriculture making rural livelihoods and food security highly vulnerable to effects of El Nino. Agriculture and livestock production in the region is hampered by its dependence on unreliable rainfall and the absence of water storage facilities. This is compounded by poor land use practices and antiquated technology and farming methods²⁸. Ethiopia has already declared a food emergency due to the effects the El Nino had on the belg/spring rains and 4.5 million people are estimated to be in need of food assistance.

In eastern parts of the Horn, where above average rains are forecasted, crop and livestock production are expected to be higher than usual. However, flood-prone zones in this area are likely to experience widespread flooding, reducing or delaying harvest as well as damaging the infrastructure. Hence, the 1997/98 scenario when El Nino caused exceptionally high rains adversely affecting food production and distribution networks is likely to be repeated.

Due to the impact of El Nino on the climate in the region, displacement, loss of livestock, damage of property and infrastructure as well as outbreaks of diseases are likely to occur. During the 1997/98 El Nino loss of life was significant in Kenya and Somalia²⁹. Higher temperatures combined with intense rainfall are projected to result in an increase malaria transmission in the highlands of Burundi, Ethiopia, Kenya and Rwanda. Increased occurrences of vector-borne as well as water-borne diseases due to poor sanitation and lack of potable water are likely to threaten the flood-affected population, especially in coastal areas of

Somalia, Kenya and Tanzania. In the 1997/98 rains, the outbreak of Rift Valley Fever in north-eastern Kenya and northern Uganda caused the death of hundreds of heads of livestock.

While the impact of the 1997/98 El Nino was significant in the region, today the impact of an equally strong El Nino is likely to influence a higher number of people, as affected regions are now



more densely populated due to population growth and urbanization. Disaster preparedness is assessed as limited in the region and governments lack elaborate emergency preparedness plans adapted to the current situation. In particular, in very vulnerable communities such as in Somalia and South Sudan, El Nino is likely to have dire humanitarian consequences as it exacerbates the underlying vulnerabilities and hazards already eroding the resilience of households including conflict, poor food security, negligible government structures and limited access to basic services or assistance. In addition, limited donor funding in 2015 further weakens the response and preparedness capabilities of the international organizations operating in the region undermining the ability of the wider system to react.

Overview: Estimated Impact of El Nino in East Africa

October – December: Kenya, Southern Somalia, Uganda, South-Eastern Ethiopia: above average rainfall, likely to cause floods.

June – November: Sudan, South Sudan, North and Central Ethiopia, Eritrea, Djibouti: dryer than average condition leading to poor harvests in Ethiopia and potentially South Sudan³⁰

IMPACT OF EL NINO ON EAST AFRICAN COUNTRIES

UGANDA

El Nino is forecasted to result in above average rainfall, causing floods and landslides in parts of the country from mid-September 2015 to January 2016. The impact of El Nino is likely to be most significant in flood-prone areas in Northern and Eastern parts of the country such as Kasese, Mount Elgon and other densely populated areas³¹. Landslides are also probable consequences of the El Nino episode, sparked by protracted rains, especially around Mount Elgon. Meteorologists have already warned that mountainous areas such as Sironko, Kapchorwa, Mbale, Bundibugyo and Kabale will face increased risk of landslides in the current short rains season, causing inundation and destruction resulting in displacement³². In the past Uganda experienced severe weather during an El Nino event in 2006, causing massive flooding in the Teso, Lango and Acholi regions.

Uganda remains susceptible to climate shocks and flooding is estimated to have significant humanitarian implications. In the past El Nino rains affected thousands and caused considerable destruction of property and infrastructure. Damage to crops as well as increased production in some areas is an anticipated result of protracted El Nino rains. Flooding is expected to be a major threat for livestock and paired with the potential crop destruction could result in higher levels of food insecurity. Moreover, vector-borne diseases such as Malaria and Rift Valley Fever are often consequences of intensified rains. Poor sanitation, surface and ground water pollution may result in increased risks of water-borne diseases. Just as in other East Africa countries, population growth has left the country more vulnerable to disasters as there is a higher population density and more people are likely to be affected.

The capacity to respond to emergencies has improved in the country and disaster preparedness programs have been implemented, however, Uganda is still ill-equipped to deal with natural hazards and highly dependent on foreign intervention and funding. During an exercise in 2014 by UN agencies to test the country's disaster levels gaps in the national early warning system, emergency preparedness and response - including the inability to pre-position emergency items - inadequate storage and transport management and problems with targeting affected populations were identified³³. In preparation for the current El Nino the government has announced that it trained military and police officers, and has broadcasted plans to resettle

³⁰ World Food Programm (2015). El Nino Implications and Scenarios 2015

³¹ UNOCHA (12.08.2015). Eastern Africa: Snapshot of predicted El Nino impact in the region

³² The East African (14.09.2015). Region told to prepare for severe El Nino rains

³³ UNISDR (18.09. 2015). Uganda gets ready for El Nino

up to 100,000 people who are living in landslide-prone areas in the eastern districts of Bududa, Bulambuli, Sironko and Manafwa appealing to them to relocate to safer areas. However, people are unlikely to electively follow government advice as they often have no place to move collectively and are unwilling to leave their property behind due to a fear of looting. In addition, while there is awareness about El Nino it is not perceived as a direct threat until in late stages. Though there have been previous warnings from the government in response to El Nino rains, the population has not heeded these alerts. Cuts in funding for international NGO’s are likely to further slow the response in case of a crisis.

Overview of Potential Impact of El Nino in Uganda

	Time	Region	Likely Impact
Uganda	Mid-September January 2016	– Eastern Uganda (Soroti, Amuria, Katakawi, Mbale, Bundibugyo, Kabale), Lake Victoria, Kasese, Mount Elgon	<ul style="list-style-type: none"> • Floods and landslides • Destruction of property and infrastructure • Damage but also increase in the harvests due to protracted rains • Disease: Malaria, Rift Valley Fever, Cholera • Death of livestock

KENYA

The current El Nino is expected to cause an above-average rainfall during the short rains (from October-December) presumed to enhance food production but also to increase the risk of flooding. Generally, the phenomenon tends to enhance rainfall in the eastern parts of Kenya more than it does in other parts of the country. Most affected areas will be the regions around the Tana River Basin (Garissa, Isiolo, Wajir), Northern Mandera, Bungoma and Malindi³⁴. Protracted rains are also likely to lead to flash floods in major urban areas, such as Nairobi, Eldoret and Kisumu. If this occurs informal settlements will be especially vulnerable to flash floods, due to poor drainage systems and the absence of urban planning. Heavy rainfalls are also likely to trigger landslides. Another aspect of concern is that if the El Nino rains continue until March next year, as projected by some scientists, the El Nino rains will be immediately followed by the short rainy reasons, which is likely to prolong El Nino impacts such as flooding, destruction of property and infrastructure as well as outbreaks of disease.

In Kenya, the short rains were extremely magnified during the 1997/98 El Nino episode. The rains, which started normally in October in most parts of the country, picked up to flooding levels during the beginning of November and continued at high levels into January the following year. The rains thereafter subsided slowly and ended by mid-February 1998 in most parts of the country³⁵.

Food security is likely to be of concern as farmers were advised to harvest early this year resulting in lower quality crops and the anticipated above average rains are expected to lead to losses in post-harvest production. Based on the 1997/98 scenario the floods affected the farms through water logging leading to further reduction in yields, the destruction of livestock, water facilities, food processing factories, stored food and transport networks. This impact on the food production and distribution is likely to result in an increase in food commodity prices further intensifying food insecurity in the country. The estimated combined loss suffered by this sector reached USD 236 million in the 1997/98 floods.

The 1997/98 floods disrupted the livelihoods of about 1.5 million Kenyans. Previous flooding seriously damaged the water infrastructure and transport networks causing severe economic losses in the longer-

³⁴ World Food Programme (2015). El Nino Implications and Scenarios 2015
³⁵ United Nations University (2002). Reducing the Impact of Environmental Emergencies through Early Warning and Preparedness- The case of the El Nino-Southern Oscillation. Impacts of the 1997/98 El Nino in Kenya

term. For the 1997/98 El Nino cycle, about 100,000 km of rural and urban roads were destroyed resulting in reduced connectivity and contributing to the overall USD 670 million worth of infrastructure damage. The meteorology department has in the last few weeks been issuing warnings over possible destruction of infrastructure given the concentration of rain expected this is another likely outcome of El Nino. For the upcoming El Nino the government estimates that 50,000 people could be affected by floods, but scientists have expressed doubts about these numbers as the modelling is reportedly based on questionable scientific methods. The electricity system is exposed and blackouts caused by the protracted rains might disrupt services and impact on the provision on medical services. The sewer system in the large urban centres is unlikely to be able to cope with flooding, increasing the risk of bursting and leaving the population in the urban centres at an increased risk of disease.

Displacement is a likely consequence of flooding. The El Nino related weather events will affect the most vulnerable communities such as rural populations, refugee camps as well as residents of urban informal settlements. In the past flooding also significantly restricted the access to the Dadaab refugee camp and surrounding isolated villages limiting the delivery of critical services³⁶. Recent military operations in vulnerable areas around the Tana River have already resulted in the displacement of communities, which are now even more vulnerable to El Nino effects.

Historically the magnified rains during past El Nino episodes posed a high stress on the health sector, which is likely to occur during the current event as well. The country's health resources were stretched beyond manageable levels. Several health facilities were physically destroyed, water sources were contaminated, and there were increases in the number of stagnant water ponds, overgrowth around homesteads and market centres, blockage of sewers and open drains, and fly breeding due to decomposition of refuse. These factors lead to an upsurge of disease epidemics and an increase in the morbidity and mortality rates. The strain to the health sector is predominantly caused by the increased prevalence of diseases such as malaria, diarrhoea and typhoid. This is likely to occur during the current El Nino, potentially even affecting a higher number of people. Cholera is a particular concern since the outbreak in 2014 and might be aggravated by above average rains³⁷. Rift Valley Fever was also a major concern after the floods caused by the 1997/98 El Nino rains.

While the Kenyan government has been very vocal about putting measures in place for the potential impact of the current El Nino, the extent of the preventive measures implemented remains unclear and doubts have arisen over the government's preparedness. In response to the 2015 El Nino an outdated El Nino plan has simply been reactivated, leaving the country ill-prepared for the current episode, as the previous plan was designed for a moderate El Nino and only considered a medium case scenario. Capabilities to deal with disaster are limited as few anticipatory measures were put in place and communication between the national and county levels has not been streamlined yet. Even after previous El Nino episodes there have been few disaster assessments, hence there are is a limited lessons learnt process to prepare for natural hazards.

Furthermore, the last census was inconclusive in many areas of the country; hence it is unclear how many people live in affected regions, which poses significant challenges to disaster contingency planning. There are also no clear mechanisms on how emergency funds are dispersed among the counties, as the National Disaster Operation Centre has limited presence at county level. Ability to mount an international response has also suffered from reduced funding and the closing of the Kenya OCHA country office, which used to lead in disaster response and contingency planning.

Overview of Potential Impact of El Nino in Kenya

Timeline	Affected Areas	Impacts
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³⁶ CARE (1998). El Nino in 1997-1998: Impacts and CARE's Response
³⁷ Kenya Meteorological Department (2015). Seasonal Forecast

Kenya	October - February	Tana River Basin (Garissa, Tana River, Isiolo, Wajir), Northern Mandera, Bungoma, Malindi, Mt. Elgon, Mt. Kenya, Mt. Kilimanjaro, Great Rift Valley, Nairobi, Eldoret, Kisumu	<ul style="list-style-type: none"> • Flooding and landslides • Displacement • Damage to property and infrastructure • Damage to harvest (increased production in other areas) • Surface and groundwater pollution • Diseases: Malaria and Rift Valley Fever • Death of livestock
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ETHIOPIA

Ethiopia remains highly susceptible to climate shocks and the current El Nino is likely to cause significant humanitarian consequences in the country. The current episode is forecasted to have a negative effect on rainfall until up to April 2016. The country suffered from depressed rains in North and Central Ethiopia and experiences above average rainfall in SE Ethiopia. Therefore, drought and flooding is likely to be witnessed in the country. Flooding is likely to occur along the Awash River in Afar and Oromia regions, along the Shebelle and Genale Rivers in Somali region; and the Oromia zone of Amhara region³⁸.

Due to depressed rains and dryness caused by El Nino, Ethiopia has experienced a poor Spring/Belg³⁹ season as well as a depressed Mehr/Summer season, resulting in the country experiencing two poor consecutive growing seasons. As 70 to 80 percent of the local population are dependent on agriculture for subsistence, the poor crop production and meagre harvests resulted in extensive food shortages and high levels of food insecurity in the country. High temperatures and depressed rains have led to poor livestock conditions, a decrease in livestock production and productivity, and a high number of livestock deaths. Farmers and pastoralists in many drought-prone areas have become dependent on humanitarian relief and food aid through September, affected households will be in Crisis (IPC Phase 3) prevented from being an emergency only with the presence of humanitarian assistance through at least December⁴⁰. The current El Nino episode is assessed to significantly impact on the humanitarian situation in Ethiopia, and in August the authorities declared that 4.55 million people will be in need of emergency food and nutrition assistance by the end of 2015. OCHA even estimates that 15 million people will be in need of food assistance for at least eight months. Food insecurity is also likely to increase as a result of rising food prices (the price of lentils in Addis Ababa is 73 percent higher than this time last year) and the already low prices of livestock has fallen by almost 80 percent in the northern Somali region⁴¹. Water shortages are also expected to be a significant challenge to the already vulnerable population.

In the past, severe droughts have resulted in major humanitarian crises in Ethiopia. Therefore, climate shocks caused by El Nino in particular frequent droughts and flooding continue to pose major threats to livelihoods and food security in the country. The 1997 and 2002 El Nino's had a significant impact on the humanitarian situation in the country and resulted in a sharp increase in food insecurity and economic losses. 2003 saw a doubling of GAM and SAM rates in under-five year olds rising up to 33.9 per cent and 8.6 per cent⁴².

The dire food situation is also likely to increase the vulnerability of the population to communicable diseases in particular for children. Moreover, communities in flood-prone areas are also more susceptible to water and vector-borne diseases.

³⁸ ACF (September 2015). Ethiopia Humanitarian Situation

³⁹ Belg-producing areas: Southern Nations, Nationalities, and Peoples' Region (SNNPR), northeastern Amhara, southern Tigray, and some areas in central and eastern Oromia. World Food Programme (2015) El Nino Implications and Scenarios 2015

⁴⁰ Famine Early Warning System Network (July 2015). Food Security Outlook Ethiopia July –December 2015

⁴¹ UNOCHA Ethiopia (September 2015). Ethiopia, a slow onset natural disaster

⁴² UNOCHA Ethiopia (September 2015). Ethiopia, a slow onset natural disaster

Overview of Potential Impact of El Nino on Ethiopia

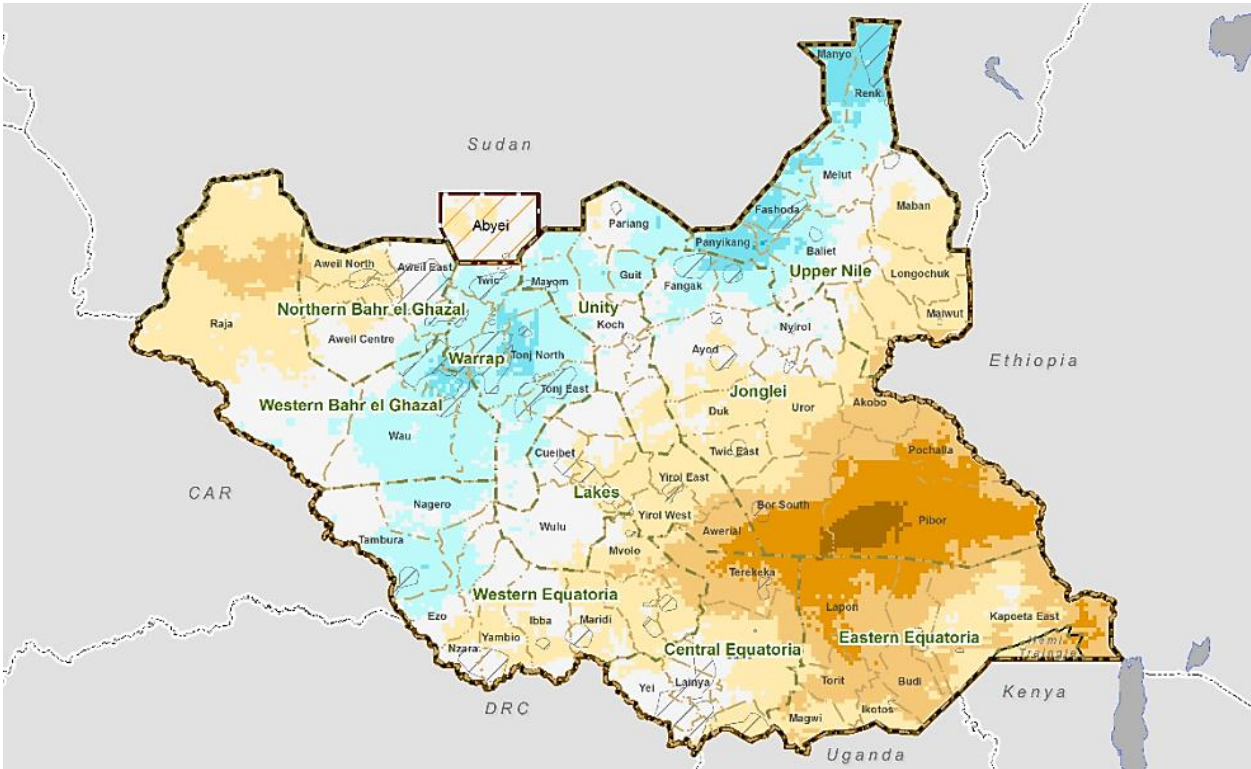
	Time	Areas Affected	Impact
Ethiopia	Up to April 2016	North and Central Ethiopia (Southern Nations, Nationalities, and Peoples' Region (SNNPR), north-eastern Amhara, southern Tigray, and some areas in central and eastern Oromia) SE Ethiopia	<ul style="list-style-type: none">• Drought• Two poor harvest seasons• High levels of food insecurity and malnutrition• Death of livestock• Diseases• Above average rain• Floods

SOUTH SUDAN

At the current stage the impact of El Nino on South Sudan is difficult to evaluate and is in need of further monitoring. Historically, the El Nino impact on South Sudan has resulted in seasonal rainfall deficits and poor vegetation development. The recent drier than average conditions observed in South Sudan could be related to the current El Nino, but the exact impact remains unclear at this stage. While the rest of South Sudan is experiencing slightly drier than average conditions, in eastern Jonglei state vegetation levels are still higher than average due to heavy rains earlier in the season. Nevertheless, in July and August, Jonglei, Eastern Lakes, Eastern Equatoria, and Central Equatoria experienced rainfall deficits. The depressed rains contributed to the worsening of the humanitarian situation leaving the population more vulnerable to food insecurity and disease. In addition, the absence of rain also facilitated favourable conditions for persistence of fighting between the warring parties, which is generally disrupted during the rainy season. A continuation of these conditions could potentially have a serious impact on crop performance in these regions⁴³. The El Nino and pessimistic forecasts for September to December rainfall in the northern half of the country, raise the possibility of drier than average conditions affecting late maturing crops in Lakes, West Bahr-el-Ghazal and Upper Nile states⁴⁴. If these rain forecasts for September to December are realized, this may impact negatively on development of late maturing crops in Lakes, Upper Nile, and West Bahr-el-Ghazal states, but provide favourable conditions for the second crop season in most of Great Equatoria States.

⁴³ World Food Programme (September 2015). South Sudan: The 2015 Rainfall Seasonal Analysis

⁴⁴ World Food Programme (September 2015). South Sudan: The 2015 Rainfall Seasonal Analysis



Source: World Food Programme. [Rainfall in South Sudan in August 2015](#). Brown shades indicate below-average rainfall, blue shades highlight above-average seasonal rainfall.

South Sudan may quickly escalate into major concern depending on the level of rainfall in the coming month. Even if El Nino only results in a moderately drier than average season the underlying vulnerabilities in the country context means that this could have a serious effect. Due to the combination of conflict and socio-economic dynamics even a minor climate shock has the potential to cause a major food crisis. Any additional food insecurity crisis in South Sudan is likely to add to already high persistent levels of malnutrition. Acute food insecurity in South Sudan is significant with indicators of famine been witnessed and cases of starvation reported. Security constraints have restricted humanitarian assistance to many areas of Unity and Upper Nile States in recent months, further limiting food access in the worst-off areas⁴⁵. It can be presumed that in case of an exacerbated food crisis, access to affected communities will continue to be very limited due to fighting and poor infrastructure.

The population in the country is also at high risk of disease outbreaks due to the dire humanitarian situation in the country. A poor harvest and increased levels of malnutrition is likely to make the population more vulnerable to communicable diseases, especially children.

Overview of Potential Impact of El Nino on South Sudan

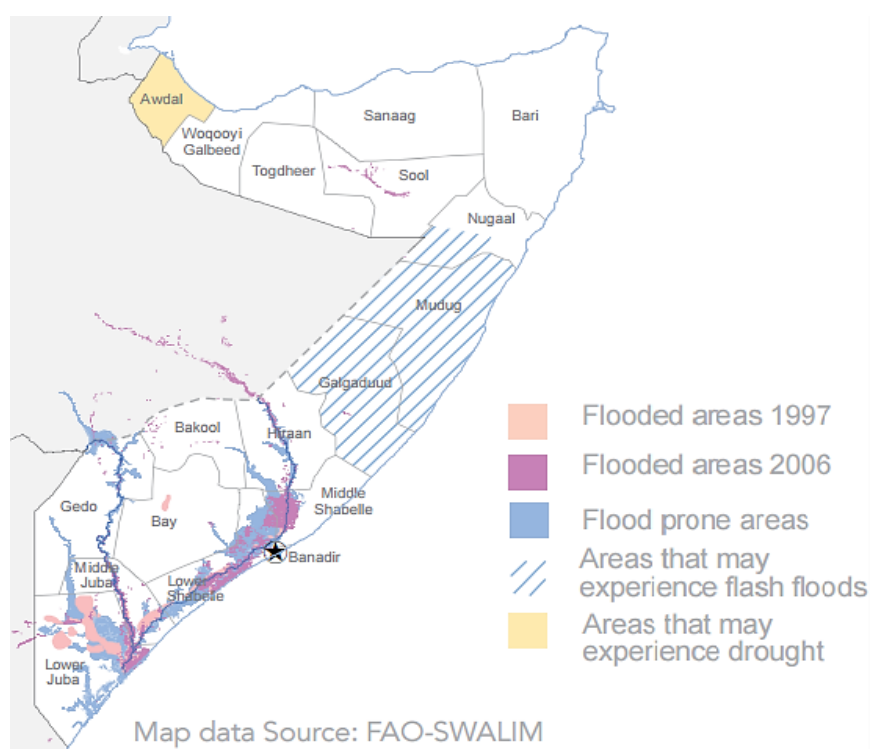
	Time	Areas Affected	Impact
South Sudan	May - November	Upper Nile, Unity State, Jonglei, Eastern Equatoria and Central Equatoria West Bahr-el-Ghazal, Great Equatoria States	<ul style="list-style-type: none">• Drought• Poor harvest seasons• High levels of food insecurity and malnutrition• Death of livestock• Diseases• Above average rain

⁴⁵ Famine Early Warning System Network (August 2015). East Africa Food Security Outlook - July to December 2015

SOMALIA

The El Nino phenomenon is expected to result in above normal rains in southern parts of Somalia. The enhanced *Deyr* rainfalls from September to December 2015 are likely to lead to flooding causing damage to crops and livelihoods, infrastructure and property around the Juba and Shabelle rivers. Estimates assume that if strong El Nino conditions materialize a population of 900,000 people living in the riverine areas of the Juba and Shabelle are likely to be affected by the floods. For Puntland flash floods are forecasted. At the same time, drier than average weather is expected in northern parts of the country due to projected below average rains and Somaliland is likely to experience drought conditions⁴⁶. Against the backdrop of fragility, conflict and very low household resilience levels, Somalia could be significantly impacted by massive flooding causing a further humanitarian crisis in the country.

The food security situation in Somalia has deteriorated in the last 6 months and 855,000 people are currently in a crisis or emergency situation, while those in a food-stressed situation remain at 2.3 million.



Source: UNOCHA. [Humanitarian Snapshot Somalia September 2015](#)

The situation is likely to deteriorate due to the impact of El Nino in the coming months exacerbating the current crisis. Hence food insecurity is expected to deteriorate from Stressed (IPC Phase 2) to Crisis (IPC Phase 3) in Middle Shabelle caused by severe flooding along the Shabelle River, which prevented cropping and reduced trade, leading to consistent high level of food prices. Food insecurity is likely to be experienced in Awdal, Hiraan, and Middle Juba Regions due to erratic April to June *Gu* rainfall, which is likely to lead to well below average harvest in agropastoral areas in the Northwest, Hiraan, and Middle Juba⁴⁷. Access to affected communities will constitute a major challenge due to flooded territories, damaged infrastructure

and persistent insecurities caused by the on-going conflict.

Protracted rains and floods are likely to cause a substantial damage to infrastructure and personal property. Furthermore, the flooding is likely to increase the displacement of communities. As well as escalating the population's vulnerability to infectious diseases such as cholera, malaria and rift valley fever.

In 1997 the heavy El Nino rains caused the worst flooding in 40 years in southern Somalia, affecting over 200,000 people, leaving large parts of the region underwater and resulting in the death of 2,000 people. Furthermore, it inflicted huge damage on the infrastructure and private households. There was very limited access to food, clean water, health care and adequate sanitation for communities in the Juba and Shabelle

⁴⁶ Food and Agricultural Organization (21.08.2015) Early Warning: El Nino threatens Somalia's humanitarian gains

⁴⁷ Famine Early Warning System Network (August 2015). Somalia Food Security Outlook July to December 2015

valleys. Diseases were rampant and a massive outbreak of rift valley fever occurred. The flooding caused by El Nino in 2006/07 affected over 440,000 people⁴⁸.

Due to the prolonged conflict, persisting insecurities and absence of even basic government structures in most parts of the country, the El Nino is likely to have a disastrous impact and little disaster mitigation measures are in place. The conflict and dire humanitarian situation has left the population with very limited resilience capabilities. Access to affected communities is likely a major challenge due to flooding and insecurity. In southern Somalia, several cities, towns and villages remain isolated by frontlines and road blocks, thus becoming urban islands with high assistance and protection needs but very limited access⁴⁹.

Overview of Potential Impact of El Nino on Somalia

	Time	Areas Affected	Impact
Somalia	September – December 2015	Southern Somalia, Juba and Shabelle Northern parts of Somalia	<ul style="list-style-type: none">• Flooding and landslides• Displacement• Damage to property and infrastructure• Damage to harvest (increased production in other areas)• Surface and groundwater pollution• Diseases: Malaria and Rift Valley Fever• Death of livestock• Drought

DJIBOUTI

The current El Nino episode is forecasted to result in below average precipitation and to cause drought conditions in the country. The expected dryness compounds two poor consecutive seasons in Djibouti this year, with Heys/Dadaa (October 2014 to February 2015) and Diraac/Sougoum (March to May 2015) rainy seasons resulting in below-normal pasture availability. Moreover, a significant shortage in water is expected⁵⁰. The El Nino paired with the refugee influx is likely to pose additional stress on the already poor economic and humanitarian situation in the country. Eight consecutive years of drought left one third of the Djibouti population currently in need of humanitarian assistance⁵¹.

Due to the expected drought conditions and poor rainy seasons El Nino is likely to further exacerbate food insecurity in the country. In May 2015 a significant deterioration was already witnessed, with a 13 percent increase in food insecurity in comparison to the previous year. An estimated 59.7 percent of rural households are already affected by food insecurity, with Dikhil and Obock regions being the worst affected areas with rates of 74 and 63 percent respectively⁵². The situation is likely to worsen with the effects of El Nino and food insecurity in Southeastern and Obock Pastoral Zones is expected to be in Crisis (IPC Phase 3) through December⁵³. Moreover, recurrent drought conditions have resulted in limited availability of food stocks, and the coping mechanisms employed by communities are stressed by inadequate pasture availability paired with a decline in labor opportunities. Very vulnerable communities, in particular, are predicted to suffer from increasing numbers of food insecurity. Global Acute Malnutrition (GAM) rates amongst refugees in the region are well above the 15% emergency threshold⁵⁴.

⁴⁸ CARE (1998). El Nino in 1997-1998: Impacts and CARE's Response

⁴⁹ ECHO (01.09.2015). Daily Flash: Somalia - Complex Emergency

⁵⁰ World Food Programme (2015). El Nino Implications and Scenarios 2015

⁵¹ UNICEF (August 2015). Djibouti Humanitarian Situation Report

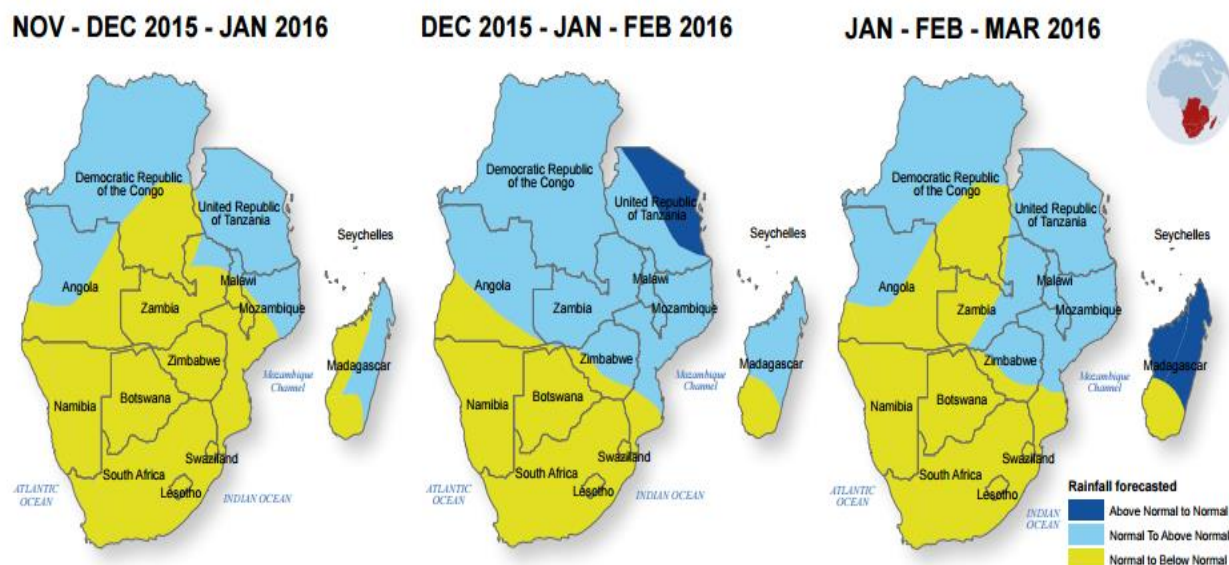
⁵² UNICEF (August 2015). Djibouti Humanitarian Situation Report

⁵³ Famine Early Warning System Network (August 2015). Djibouti Remote Monitoring Report

⁵⁴ UNICEF (August 2015). Djibouti Humanitarian Situation Report

The El Nino impact on the climate is expected to increase the vulnerability of the population to disease caused by high levels of malnutrition. Moreover, the very vulnerable refugee communities are especially susceptible to the consequences of the event. In the past, El Nino episodes have resulted in the outbreak of diseases in Djibouti, notably the cholera epidemic in 1997/98 caused by extensive flooding as well as the meningitis outbreak the same year⁵⁵.

El Nino Impact on South Africa



Source: UNOCHA, [Regional Climate Outlook Summary \(2015\)](#)

El Nino typically has a strong impact on the climate in Southern Africa. The phenomenon often causes drier than average conditions in the region, as well as higher than average precipitation in northern/north-eastern parts of Southern Africa. The ENSO is estimated to be responsible for 50 percent of the variability of precipitation in the region. The current El Nino is likely to damage harvests, cause drought conditions and create water shortages, especially in South Africa, Swaziland, Lesotho, Botswana, Namibia, southern Mozambique and Zimbabwe. The next rainfall season is expected to occur from October to May 2016 and El Nino is likely to impact on this season until March 2016. Normal to below precipitation is expected from October until December. From December normal to below average rainfalls are forecasted for the southern half of the region and above average rainfall to occur in the northern/north-eastern parts of the rain. While forecasts predict depressed precipitation for the next season in particular affecting Botswana, Zimbabwe, South Africa and southern Mozambique, northern and central Madagascar is expected to receive above-normal rainfall⁵⁶. As below average rainfall between October and March coincides with the main cropping season, the current El Nino is likely to impact negatively on the harvest, as the previous season already influenced by the event recorded significant production losses. Another poor harvest in the next season is likely to increase food insecurity as there are lower regional stocks⁵⁷.

Through high temperatures and prolonged dryness, El Nino is predicted to increase food insecurity in the region. Food insecurity in the region is likely to increase due to the current El Nino episode causing two consecutive poor harvest season At least 1.5 million people, 16 percent of the rural population are facing food insecurity in Zimbabwe currently. This contributes a significant increase in comparison with the

⁵⁵ McMichel, A. (2003). Climate Change and Human Health

⁵⁶ OCHA (2015). Southern Africa Regional Climate Outlook Summary

⁵⁷ Famine Early Warning System Network (July 2015), Zimbabwe Food Security Outlook July – December 2015

previous year (163 percent)⁵⁸. Due to the depressed rainfalls water supplies are also likely to be affected and water shortages are to be expected in the region. Moreover, communities suffering from food insecurity and malnutrition are likely to be more prone to disease; hence an outbreak of diseases is likely.

Five out the eight El Nino events recorded in the region between 1965 and 1997 caused drought conditions resulting in a significant decline in agricultural production including crop losses and death of livestock, exacerbating food insecurity. Moreover, the events caused significant economic losses as a sharp decline in GDP was witnessed. In 1992, El Nino caused the region's worst drought in a century, affecting around 86 million people, 72 percent of the population. Forecasts have estimated that the current El Nino episode in Southern Africa is expected to be similar to the one in 1997/1998⁵⁹.

In recent years there has been an amelioration in emergency management capabilities and disaster preparedness in the region, since the 1991/92 drought highlighted its vulnerabilities and SADC formed task forces to deal with natural hazards disaster. Nevertheless, Southern Africa remains highly susceptible to climate shocks. Limited funding is invested in DRR and many governments have few capabilities to cope with natural hazards leaving the population vulnerable. The humanitarian situation increases vulnerabilities further as communities are weakened by the political crisis in Madagascar, the Mugabe dictatorship in Zimbabwe and the conflict in Angola. Poverty is still prevalent and disease rampant, with Southern Africa being the region with the highest HIV infections. This macro context creates even higher vulnerabilities to climate shocks. Moreover, high population growth also resulted in a higher population density and a larger number of people being affected.

The southern Africa region is generally affected by depressed rainfall and poor growing seasons during El Nino events. Recurrent droughts have been experienced through various El Nino episodes, in 1992, El Nino caused the region's worst drought in a century, affecting around 86 million people, 72 percent of the population⁶⁰.

Overview of Potential Impact of El Nino on Southern Africa

October to February likelihood of drier than average conditions and depressed rain falls in South Africa, Swaziland, Lesotho, Botswana, Namibia, Mozambique and Zimbabwe

January – March 2016 drought conditions in South Africa, Botswana, Namibia, Zimbabwe, Mozambique, Lesotho, Swaziland and above average rainfalls in northern and central Madagascar⁶¹

ZIMBABWE

El Nino events typically have a strong connection with below-average rainfall in Zimbabwe during the subsequent rainy season. The negative impact of El Nino, which is expected to last until April 2016, on the climate has already been illustrated in Zimbabwe, causing depressed rainfall and drought conditions. The impact of El Nino on the previous growing season has resulted in production losses and the event is anticipated to cause lower than average precipitation in the coming October to December season, creating two consecutive poor cropping seasons⁶². Furthermore, water shortages are likely to occur in the country caused by high temperatures and dryness. The poor harvests have to be seen against the backdrop of limited resilience capabilities of the local population and reduced stocks through several years of poor rainy seasons, failed land reforms and meagre harvests. Moreover while drought is the most common threat to

⁵⁸ World Food Programme (June 2015). Zimbabwe Brief

⁵⁹ UNOCHA (2015). Southern Africa Regional Climate Outlook Summary

⁶⁰ UNOCHA (2015). Southern Africa Regional Climate Outlook Summary

⁶¹ World Food Programme (2015) El Nino Implications and Scenarios 2015

⁶² World Food Programme (2015). El Nino Implications and Scenarios 2015

agriculture in Zimbabwe, only 7.6% of farmers practice conservation agriculture⁶³. Drought conditions leading to water shortages

Levels of food insecurity are high in the country and drought caused by El Nino is expected to further aggravate the situation. A report by the Zimbabwe Vulnerability Assessment Committee (ZIMVAC) estimates that 1.5 million people, 16 percent of the rural population, to be food insecure, a 164 percent rise in comparison to the previous year⁶⁴. The numbers are anticipated to increase under El Nino conditions and likely to last until March 2016. According to WFP Zimbabwe and Malawi are facing the worst food security crisis in a decade. Among the worst affected areas are the southern province of Matabeleland North, Masvingo and Matabeleland South. The majority of districts in the south are forecasted to be in Crisis (IPC Phase 3). Maize production has declined by almost 50 percent compared to last year and livestock is sold at very low prices⁶⁵. The livelihood options are likely to be worsened including casual labor availability, vegetable production, and livestock sales, potentially forcing households to engage in extreme coping strategies, including asset stripping due to depressed El Nino rains⁶⁶. Worsening macro-economic conditions will likely result in increased numbers of households facing challenges in accessing food.

Rooted in high levels of malnutrition and water shortages, disease outbreaks are likely to occur in the country. Drought conditions, a poor harvest and increased levels of malnutrition are likely to make the population more vulnerable to communicable diseases, especially children.

While the SADC has agreed to implement the Sendai Framework for Disaster Risk Reduction and to conceptualize national action plans to mitigate natural hazards. Zimbabwe has basic capabilities to deal with natural hazards. Years of poor harvests, a dire economic situation, poor economic management, destructive land reforms, high unemployment and political violence have left the population with little resilience and coping strategies. International funding for the country has decreased hence little funds are available for disaster preparedness. The lean season humanitarian assistance is expected to be lower than average due to a challenging funding situation.

Overview of Potential Impact of El Nino on Zimbabwe

	Time	Areas Affected	Impact
Zimbabwe	October - April		<ul style="list-style-type: none">• Drought• Poor harvest seasons• High levels of food insecurity and malnutrition• Death of livestock• Diseases

MADAGASCAR

During the current El Nino episode northern and central Madagascar are expected to receive above-average rainfall while the southern parts are likely to experience below-normal precipitation, hence drought and floods are likely to occur in the country⁶⁷. The event is forecasted to influence weather patterns on the island from November to March 2016, although the extent and affected areas vary and are shifting throughout the

⁶³ The Zimbabwe Independent (11.09.2015). Farmers hopeless as El Nino drought beckons

⁶⁴ World Food Programme (August 2015). 10 Facts about hunger in Zimbabwe

⁶⁵ Agence France Presse (24.09.2015). Villagers in Zimbabwe skip meals to save scant food

⁶⁶ Famine Early Warning System Network (August 2015). Zimbabwe Food Security Outlook

season. Above average rainfall causing flooding are only expected in northern Madagascar from January to March 2016⁶⁸.

The current El Nino is expected to have a negative impact on food security in the country and the situation is likely to deteriorate in the coming months. With the country experiencing the worst drought conditions in 6 years, the situation is presumed to be aggravated by El Nino. Currently, 579,000 people are severely food insecure and 200,000 are estimated to be in need of immediate food assistance⁶⁹. Southern regions are the most affected, especially the drought-affected areas of Androy, and Anosy, where poor harvests, low food availability, high food prices, limited resilience capabilities, and an early exhaustion of food stocks, intensified food insecurity. Due to low maize production in Tsihombe and Ambovombe districts, households are expected to be in Crisis (IPC Phase 3) through December 2015⁷⁰. Flooding and drought caused by El Nino is expected to further exacerbate food insecurity⁷¹. Furthermore, depressed rainfalls causing meagre harvest in southern Madagascar may result in below-average labor opportunities as the peak of the lean season approaches⁷².

Increasing levels of food insecurity caused by El Nino impacts leaves the population more vulnerable to disease. Flooding in northern parts of the island is presumed to create favorable conditions for the outbreak of vector and water-borne diseases. A recent study has found that large outbreaks of plague tend to coincide with the timing of El Nino events in the country. The alteration of temperatures and precipitation is found to have significant effects on the populations of rodents that carry plague on the island, as well as the fleas that spread the infection⁷³. In light of the current outbreak in plague, a further increase could be caused by El Nino conditions⁷⁴. Moreover, Malaria and cholera outbreaks have reported during previous El Nino events in the country.

Drought conditions are recurrent during El Nino episodes in Madagascar, for example in 2006/07 the country was severely affected by drought and had an increase in the prevalence of fire⁷⁵. In addition, there has been an increase in the intensity and number of cyclones, which displace human communities and lead to local famine and cholera outbreaks⁷⁶.

Overview of Potential Impact of El Nino in Madagascar

	Time	Areas Affected	Impact
Madagascar	Up to March 2016		<ul style="list-style-type: none">• Drought• Two poor harvest seasons• High levels of food insecurity and malnutrition• Death of livestock• Diseases: Plague, cholera, malaria• Above average rain• Floods

⁶⁸ However, few larger scale studies have been conducted at this stage on the impact on El Nino on the local climate; therefore more research is needed to quantify how El Nino impacts on various regions throughout Madagascar.

⁶⁹ Famine Early Warning System Network (September 2015). Food Assistance Outlook Brief

⁷⁰ Famine Early Warning System Network (August 2015). Madagascar. Remote Monitoring Report

⁷¹ UNOCHA (May 2015). Humanitarian Bulletin Southern Africa

⁷² Famine Early Warning System Network (August 2015). Madagascar. Remote Monitoring Report

⁷³ University of Liverpool (August 2014). Scientists show plague outbreaks linked to El Nino climate conditions

⁷⁴ World Health Organization (September 2015). Plague-Madagascar

⁷⁵ Food and Agricultural Organization (2014). Understanding drought impact of El Nino on the global agricultural areas

⁷⁶ Minnesota State University (May 2012). Encyclopedia of Global Warming & Climate Change Madagascar

EL NINO IMPACT IN WEST AND CENTRAL AFRICA

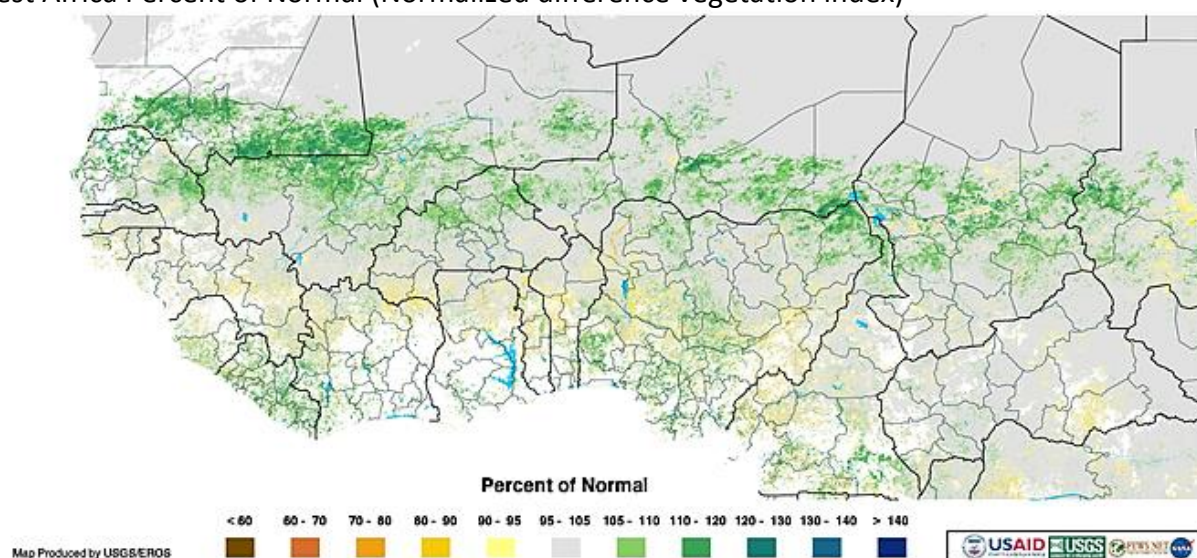
Generally speaking, the intensified climate patterns caused by El Nino could have severe consequences in West Africa, impacting on the harvest, especially on areas where food insecurity is a continual concern. Historically, an El Nino event has significantly impact on the Sahel areas, already very vulnerable to climate variations, leading to growing season rainfall deficits and poor vegetation development. It is an additional stress on areas characterized by endemic poverty, a large and growing young population with limited access to quality education and employment.

Rainfall began normally in April in the Gulf of Guinee and late in south Sahara and Sahel areas. In Sahel, the early stage of the growing season have been unfavourable and, conforming with historical patterns, in June below average rainfall, delayed onset of the planting season and depressed vegetation levels were already evident.

Since April 2015 the rainfall situation has improved markedly in most of the region. Rainfall effectively started mid-July and intensified in August. This has led to localized floods particularly in Benin, Burkina Faso, Ivory Coast, Mali, Niger and Togo. WFP and FAO estimate that 83,843 people were affected and over 600 hectares of crops destroyed. The most affected countries are Guinea (29,599 persons), Burkina Faso (20,346 persons) and Niger (20, 089 persons). However precipitation deficits that could negatively affect agricultural activities and pastures in localized areas are being reported in the south of Benin, Ghana and Togo, northwest Mali, central Mauritania, northeast Niger and central Chad⁷⁷.

River basin flows have also reach above the average levels of last decades in the region⁷⁸. Vegetation is overall satisfactory with small deficits in parts of Burkina Faso, Niger, Chad and Mauritania.

West Africa Percent of Normal (Normalized difference vegetation index)⁷⁹



Source: [USGS](#) Vegetation index anomaly in West Africa from 21 to 30 September 2015

The improved rains allowed for the regeneration and filling of water points for livestock. Agricultural production could be average or good in the region with localized deficiencies⁸⁰. 2015/2016 cereals

⁷⁷ World Food Program and Food and Agricultural Organization (August 2015). Joint note

⁷⁸ PREGEC (16.09.2015). Dispositif régional de prévention et de gestion des crises alimentaire Sahel et en Afrique de l'Ouest

⁷⁹ [U.S. Geological Survey](#). eMODIS 250m. The eMODIS collection is based on the Moderate Resolution Imaging Spectroradiometer (MODIS) data acquired by the National Aeronautics and Space Administration's (NASA) Earth Observing System (EOS).

⁸⁰ PREGEC (16.09.2015) Dispositif régional de prévention et de gestion des crises alimentaire Sahel et en Afrique de l'Ouest

production in Sahel and West Africa is expected to reach between 54 and 62 million tons, i.e. between a 3% decrease and an increase of 11% compared to the last 5 year average.

However, despite the overall improvement, in some areas the situation is still not normal and livestock were affected by the long lean period, especially in areas that have experienced a delayed start to the rainy season (e.g. borders of Burkina Faso and northern Benin, between southern Mauritania and Mali, northern Senegal and eastern Chad). While the recent increase in precipitation is expected to lead to more favourable ground conditions, a delayed onset and uneven rainfall distribution observed during the June-September season could impact cropping and pastoral conditions in the region⁸¹.

From September to November 2015, Sahel may benefit from near average precipitation, while near to below average precipitation will very likely occur over westernmost part of Guinea Conakry, Sierra Leone, Liberia and West Ivory Coast⁸², Gabon, Congo Brazzaville, south Cameroon, and southwest Central African Republic. An early cessation of rains for a swath stretching across Southern Niger and Chad is also expected. "This presents a risk for zones within that band that experienced a delayed start of the rainy season. In light of this potential early end to rains, Diffa and Tillabery (Niger), Tapoa (Burkina Faso) and the central band of Chad are at risk of a rainfall deficit"⁸³.

Impact of El Nino in other parts of the world could have consequences in West Africa. The region could be affected by the increase in imported cereal prices, since El Nino is more likely to negatively affect the cereal exporting countries in the Pacific. However, cereal availability currently remains satisfactory in the region. Compared with last year and the five-year average, cereal prices are stable and relatively low throughout the region. Nevertheless, price increases above 15% have been observed in Ghana and in several areas in Chad. Increases between 5% and 15% were observed in southern Mauritania, Northern Mali and Western Burkina Faso⁸⁴. This upward trend negatively impacts food access of the most vulnerable households.

A significant impact of El Nino on West Africa food security is unlikely this year. However, the vulnerable areas mentioned above continue to be monitored at national and regional level. Imported cereal prices (particularly rice) also deserve continued attention in anticipation of the eventual impact of El Nino on export markets, particularly in Asia and America.

Overview of Potential Impact of El Nino in West Africa

Historical patterns of el Nino impact in WCA: with rainfall deficit, delays on set of the planting season and depressed vegetation levels

Forecasts and recent observations suggest a weak impact of el Nino in WCA areas

Uncertain forecasts of future rains as the plurality of conflicting analyses and forecasts should encourage caution predicting el Nino impact and constant monitoring.

West Africa could be affected by the increase in imported cereal prices, since El Nino is more likely to affect negatively the cereals exporting countries in the Pacific

ASIA (Indian subcontinent and Southeast Asia)

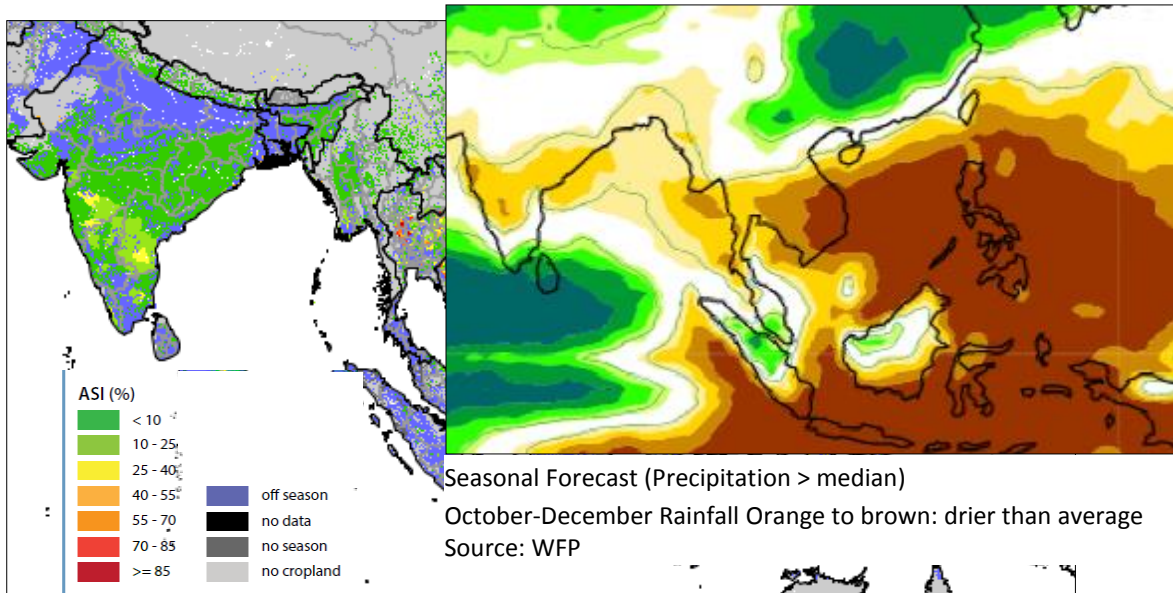
⁸¹ For more information on food security situation by countries, see: FAO WFP (August 2015). Joint note about Sahel and West Africa. PREGEC (September 2015). Country Reports

⁸² African Center of Meteorological Application for Development (August 2015)

⁸³ ACF (August 2015). Regional Fact Sheet Sahel - Rainy Season

⁸⁴ World Food Program and Food and Agricultural Organization (August 2015). Joint note. ACF (August 2015). Regional Fact Sheet Sahel - Rainy Season

Asia accounts for more than 90 percent of the world rice production and consumption. As a result droughts have a severe impact in the region, which increases as their frequency, severity and duration are intensified. This amplification is attributed mainly to a rise in temperature, especially during El Nino events. In South Asia nearly half the



Source: FAO GIEWS (September 2015)

droughts are associated with El Nino. The 2015/16 episode could have a significant impact on the region, affecting large tracts of the main rice-producing areas.

If both droughts and floods are concurrently occurring, the effects of drought are expected to be more critical. Rainfall predictions (up to December 2015) forecast that drier than average conditions intensifying over Southeast Asia could result in an increase in the impact of the event on the cropping season on the continent. Early 2016 climatic projections predict substantial seasonal precipitation anomalies in Southeast Asia, affecting Indonesia and the Philippines. This is of particular concern for Indonesia, where planting takes place at the end of the year.

The picture given by ASI⁸⁵ of the start of the season concentrates worrying figures in small pockets in Thailand, Cambodia and Laos, while the rest of the region appear relatively spared. Prospects for the 2015 main rice crops remain overall favourable so far⁸⁶.

However, impacts of the drier than average conditions on farming activities (such as reduction in area planted, delayed planting and stressed early crop development) will have lasting effects on the coming cropping season and beyond. Affected farmers may diminish their productive assets, borrow heavily, and increase their use of fertilizers. Land degradation may occur from adjustment mechanisms and result in lower production capacity on the long term. With below average rainfall being so far the dominant feature of the 2015 season across South Asia, signs of negative impact are already registered⁸⁷.

All countries in South Asia do not follow the same cropping season within the May to October window, and some areas are likely to be affected later on, as the continuation of El Nino conditions worsen towards the beginning of 2016.

South Asia Cropping Seasons (Rice and Maize)

⁸⁵ The Agricultural Stress Index (ASI) is an index based on the integration of the Vegetation Health Index (VHI) in two dimensions that are critical in the assessment of a drought event in agriculture: temporal and spatial.

⁸⁶ Food and Agriculture Organization (July 2015). GIEWS Update, El Nino in Asia

⁸⁷ World Food Programme (July 2015). East Asia Seasonal Outlook, The 2015 Rainfall Season

Country	Next cropping season		El Nino's impact
	Planting/Growing	Harvest	
Most South Asia countries	May-July/August	September-November	June-October
Indonesia, Viet Nam, Timor-Leste	October-December	January-February	June-January

Three countries are of highest concern in the region (drought warning issued): India, Thailand and the Philippines; while Laos and Indonesia appear secondary but still high, at the alert level (drought advisory issued). Of the 1.2 billion people worldwide considered as poor, over 43% are found in South Asia, the vast majority of them living in rural areas. Despite improvements in national food security over the last three decades, benefits have not yet reached the entire population of the region and approximately 254 million people are still undernourished⁸⁸. These are the global figures of the vulnerable population in South Asia to be hit by a severe El Nino.



Source: OCHA. El [Nino](#) Snapshot Asia-Pacific region (August 2015)

Overview Potential Impact of El Nino in South Asia

October to December 2015: likelihood of drier than average conditions and depressed rain falls in India, Thailand, Vietnam, Indonesia, and the Philippines.

January to March 2016: Indonesia and the Philippines likely to face precipitation anomalies.

The growing season of May-October 2015 is unfolding under an evolving major El Nino event that will peak in late 2015 and is likely to continue in 2016.

IMPACT OF EL NINO ON SOUTH ASIAN COUNTRIES

⁸⁸ Food and Agricultural Organization (2014). Understanding drought impact of El Nino on the global agricultural areas

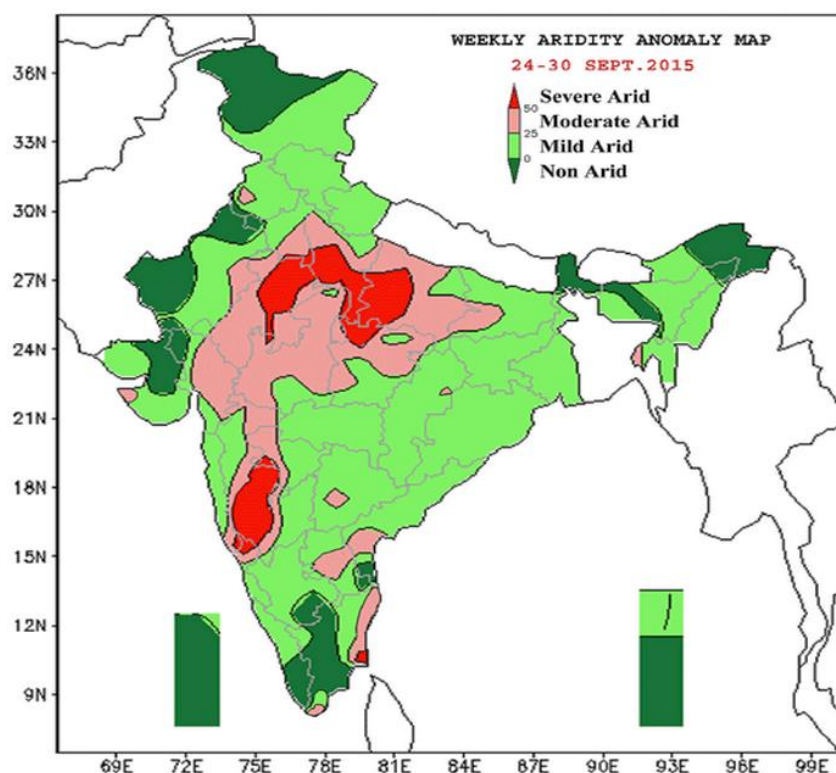
INDIA

India has systematically been one of the most-affected countries by droughts in the region, with data showing that 10 out of 13 droughts that occurred since 1950 have had an El Niño connection. After a timely and wetter than average start of the monsoon season⁸⁹, India experienced rainfall deficits from late June onwards.

This led to lower than average vegetation cover across most of the subcontinent. This is most noticeable in major crop growing areas of the northwest and central north, while stronger impacts are so far being felt in the western half of the country (from Gujarat to Karnataka), where water reservoirs fortunately filled in June are now emptying.

The critical period in terms of seasonal performance in India is July to September. Over the past few months, the situation has seemed to be increasingly worse than expected. In April 2015, the India Meteorological Department (IMD) issued a Monsoon forecast stating that rain fall during this period would reach 93% of the normal. A further statement in July revised the figure to 88% of the normal, slightly below the official “drought” threshold of 90 percent⁹⁰. In early August, the IMD reported a rainfall deficit as high as 57 percent in some areas⁹¹. The country is experiencing a shortage of water for irrigation and drinking, as water level in 91 major reservoirs had dipped 16% below normal⁹². While the country heavily relies on the Monsoon season to refill up its reservoirs (for about 75% of their annual capacity), a disappointing second half of the Monsoon is of concern beyond the effect on the agricultural sector. The situation is particularly worrying in western and southern regions, while the situation in the North is marginally better due to heavy downpours in the Himalayan states.

The population’s resilience to environmental shocks in India is directly correlated to population density and poverty. The areas recording the highest population density rates match with those experiencing severe arid conditions, and despite economic growth, high levels of poverty, food insecurity and malnutrition persist in the country. An estimated 32.7 percent of the Indian population lives on less than US\$ 1.25 per day, and the country is home to a quarter of all undernourished people worldwide⁹³. The consequences of drought can be disastrous. Historically, production loss during drought years was estimated at 30-40% (combining yield loss and area loss), while at the micro level, drought-affected households could suffer rice production loss from



⁸⁹ [The Indian Express](#) (02.09.2015) “The surprisingly good rainfall in June was attributed to MJO, a moving system of wind, cloud and air pressure that brings rain as it circles the earth around the equator (...). MJO is a temporary phenomenon and lasts barely a week or 10 days in any particular region”.

⁹⁰ World Food Programme (July 2015). East Asia Seasonal Outlook, The 2015 Rainfall Season

⁹¹ Office for the Coordination of Humanitarian Affairs. (August 2015). Asia-Pacific Region, El Niño Snapshot

⁹² Economic Times. (4.09.2015). Water Levels Dip in Reservoirs, Alarm Bells Ring Across States

⁹³ World Food Programme, [India](#)

40 to 70%⁹⁴. These estimates are believed to be an accurate prediction of the future potential impacts. The economic costs also can be enormous at both national and international levels (India is one of the main rice exporters of worldwide).

The capacity of the Indian government and of the state authorities⁹⁵ to take quick steps will be determinant in mitigating the already alarming situation of water scarcity. Since the 19th century, the state has been the sole provider of water. The questions of water availability, quality, and management, in particular in areas where rainfall is critical to the livelihoods of so many, will determine the way the country will be able to cope with the lasting consequences of the drought that resulted from the current El Nino.

Overview Potential Impact of El Nino on India

	Time	Areas Affected	Impact
India	Up to October 2015	Punjab, Haryana, western parts of Uttar Pradesh and West Bengal in the north, Odisha in the west, as well as the interior areas of Andhra Pradesh and Tamil Nadu	<ul style="list-style-type: none">• Drought• Main harvest season affected• Potential poor secondary harvest season• High levels of food insecurity and malnutrition• High food prices inflation• Water-borne diseases

INDONESIA

Indonesia has historically been severely affected by El Nino, with marked rainfall deficits extending throughout the year. The most recent forecasts for the August-October rainfall indicate drier than average conditions over the country, while forecasts for the later part of the year (October to December) are equally pessimistic with drier than average conditions intensifying over Southeast Asia and particularly affecting Indonesia⁹⁶. On a longer perspective, Indonesia is clearly expected to endure drier than average conditions until 2016.

In Indonesia, the next cropping season occurs between October and February, the later months of the year are of particular importance as they correspond to the planting period (when the crop is very sensitive to water scarcity). Fortunately, the country’s 2015 main season paddy crop, which accounts for the bulk of the annual production, was harvested by mid-June. Favourable weather during the growing season, coupled with initiatives launched by the Government to support production, including the rehabilitation of irrigation channels, distribution of subsidized seeds and fertilizers have resulted in good yields for the 2015 main season rice crop⁹⁷. However, the consequences of a lasting El Nino in the coming months could have a very negative impact on the agricultural season that is currently underway. Extended drought conditions could result in food and water scarcity and impact job security and income, especially in at-risk sectors such as agriculture and tourism.

At country level, there are multiple factors impacting the crop production system which could be compounded by an El Nino-related drought. While the country is located in a disaster-prone area, particularly threatened by the effects of climate change, small farmers are notably suffering from a lack of quality fertilizers and devastating urban sprawl. In Java alone, farmers have lost some 200 km² of cropland a year to industry and human settlements⁹⁸. Despite the continued increase in urbanization and the concomitant loss of agriculture lands, especially paddy lands, agriculture is still a major source of livelihood for the population, as in the entire Southeast Asia region. In

⁹⁴ IFAD (2009). Droughts, coping mechanisms and poverty, Insights from rainfed rice farming in Asia
⁹⁵ India is a country where the international community has a relatively small margin of manoeuvre to respond to crises.
⁹⁶ World Food Programme (July 2015). East Asia Seasonal Outlook, The 2015 Rainfall Season
⁹⁷ Food and Agriculture Organization (July 2015). GIEWS Update, El Nino in Asia
⁹⁸ Food and Agriculture Organization (2012). Rice in Southeast Asia: facing risks and vulnerabilities to respond to climate change

addition, lowland rice production areas (either being irrigated or rainfed) rely on an ample water supply, and thus are more vulnerable to drought stress, which is becoming an increasingly severe problem in Indonesia.

As a result the country is particularly sensitive to El Nino variations. In 1997/1998, droughts caused massive crop failures, water shortages and forest fires in various parts of Indonesia. The majority of the country's 34 provinces were experiencing drought caused by the El Nino phenomenon, warning of increased risk of fires, and pointing to the east of the country (Papua) as one of the most-affected regions⁹⁹. Paradoxically, while droughts and related fire threats are of major concern country-wide, localized areas (Nduga, Lanny Jaya, Puncak Regency) also experienced snowfalls, hailstorms and extreme drops in temperatures that impacted crop production, led to the death of livestock and to illness among inhabitants.

Around 158 hotspots were detected in the past weeks in Sumatra alone¹⁰⁰, and their number will continue to rise through October. Overall, an estimated 200,000 hectares of land could be impacted by the heat wave, potentially causing crop failure in 10-20 percent of farmland. That would likely force the Indonesian government to import more rice than usual for its national consumption and could impact the country's exportations of palm oil, cocoa and coffee¹⁰¹.

To date, the situation is presented as under control by the government, who announced that rice stocks were sufficient to weather the peak of El Nino¹⁰². However, the Central Statistics Agency acknowledged that its annual estimates did not factor in the potential impact of El Nino, and therefore that the real production and stock figures could be lower as a result of harvest failure.

Even if governmental efforts to anticipate El Nino-related drought and harvest failures (by building irrigation channels, small dams and shallow wells, and distributing water pumps to farmers) are undeniable, in reality the implementation of compensating measures, in particular in remote areas where the under-nutrition figures of already of concern, can legitimately be questioned.

Overview Potential Impact of El Nino on Indonesia

	Time	Areas Affected	Impact
Indonesia	Early 2016	West Nusa Tenggara, East Nusa Tenggara South Sulawesi, South and West Papua, South Maluku, Bali, Java	<ul style="list-style-type: none">• Drought• Fires• Poor winter harvest season• High levels of food insecurity and malnutrition• High food prices• Water-borne diseases

THE PHILIPPINES

Regional rainfall forecasts up to the end of 2015 show similar patterns for the Philippines as in Indonesia. A significant difference, though, is that the Philippines already experienced pronounced dryness during the months of March-May 2014. This led to delays in the start of agricultural activities and adversely affected yield potential of early-planted cereals (including soybeans and potatoes). In continuation, forecasted drier than average conditions towards December 2015 will affect the second season crops, while drought warnings are now in place in central and northern provinces. In a longer perspective, meteorologists predict that below normal rainfall conditions are likely to intensify into 2016. The strengthening of El Nino could also trigger erratic behaviour of tropical storms.

⁹⁹ [World Bulletin](#) (26 July 2015). El Nino causes drought in Indonesia.

¹⁰⁰ [World Bulletin](#) (26 July 2015). El Nino causes drought in Indonesia

¹⁰¹ "Estimates by the Indonesian Coffee Exporters and Industries said the country's coffee output will likely reach 600,000 to 650,000 tonnes, from an earlier forecast of 650,000 to 700,000 tonnes." Southeast Asia Commodity Digest, 24 August 2015.

¹⁰² The Jakarta Post (September 2015). "Food stocks enough to bear El Nino peak",

With less rainfall, the shortage in the water supply becomes more prevalent, leading to water-rationing. This may affect the power supply in the country. Drought may, moreover, lead to shortage in food supply¹⁰³. To date, large rice and maize growing areas have already been affected by the prolonged dry spell, with late and insufficient rains to revert the damages inflicted by months of depressed rainfalls. The effects of El Nino are mostly felt by small-scale farmers and those who are fishery-dependent. Poverty is considered the most important factor in determining disaster vulnerability¹⁰⁴, and the proportion of Filipino families in extreme poverty, was estimated at 7.6% during the first quarter of 2014¹⁰⁵. The estimated number of extremely poor families is around 1.61 million¹⁰⁶.

In 1997 El Nino affected 74,000 hectares of agricultural lands in 18 provinces in the Philippines. More than 74 people died and almost half a million agricultural families experienced hunger because of the drought. The Philippine government and environmental groups have since instituted measures to mitigate the effects of the weather phenomenon. For instance, the EcoWaste Coalition has called on the public to reduce water and electricity consumption, while the Department of Agriculture (DA) has already implemented measures to lessen the impact of El Nino on the country's main agricultural products (notably by implementing cloud-seeding operations in different parts of the country and initiating water-management programs¹⁰⁷). Governmental programs also included the installation of small water-impounding projects and diversion dams in rice-growing regions. Despite mitigation measures implemented by a quite pro-active government, the country remains extremely vulnerable to El Nino-related disasters, as it is also to a wide range of other natural phenomena.

Drought Early Warning in Province Level



Source: [Institute of Industrial Science, University of Tokyo, EWNG Philippines](#)
29/09/15

Overview Potential Impact of El Nino on the Philippines

	Time	Areas Affected	Impact
Philippines	Early 2016	Cagayan, Isabela, Nueva Ecija, Tarlac, Pangasinan, Camarines Sur, Iloilo, Negros Occidental, Bohol, Leyte, and some areas in Mindanao	<ul style="list-style-type: none">• Drought• Repeatedly poor cropping seasons• High levels of food insecurity and malnutrition• High food prices• Power supply affected• Typhoons

CONCLUSION

¹⁰³ Rappler (March 2015). "How El Nino could affect the Philippines in 2015", [Rappler](#), updated in March 2015

¹⁰⁴ Overseas Development Institute (2013). The Geography of poverty, disasters and climate extremes in 2030

¹⁰⁵ [Philippine Statistics Authority \(06.03.2015\). Poverty incidence among Filipinos registered at 25.8%, as of first semester of 2014](#)

¹⁰⁶ [Philippine Statistics Authority \(06.03.2015\). Poverty incidence among Filipinos registered at 25.8%, as of first semester of 2014](#)

¹⁰⁷ [Channel News Asia](#) (September 2015). "Philippines braces for worse El Nino phenomenon",

As outlined the report the 2015/16 El Nino episode, expected to be among the four strongest events since 1950, is likely to have a substantial impact on East and Southern Africa, Asia and to a lesser extent West Africa. While the impact of El Nino related weather fluctuations is difficult to predict, natural hazards such as floods, droughts and cyclones are anticipated to occur in the outlined regions, causing significant hardship to affected communities. In the past El Nino episodes were responsible for loss of life, damage of property and infrastructure, outbreak of diseases, famines as well as longer-term consequences such as poverty, malnourishment and reduced income availabilities. Most affected communities have limited resilience mechanisms in place to cope with natural disasters as poverty, conflict and poor governance have diminished their capabilities to mitigate external shocks. Hence, it is anticipated that fragile or conflict-affected states like Somalia or Zimbabwe will suffer the greatest consequences of the El Nino phenomenon. Natural hazards including El Nino might become more frequent with climate change, as a result a lack of resilience capacity will be a critical determinant of vulnerability.

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@InteragencyRAN

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INSTITUT DE RELATIONS INTERNATIONALES ET STRATÉGIQUES (IRIS)
2 bis rue Mercoeur - 75011 PARIS / France
T. + 33 (0) 1 53 27 60 60
contact@iris-france.org
@InstitutIRIS
www.iris-france.org

ACTION AGAINST HUNGER (ACF UK)
First Floor, Rear Premises, 161-163 Greenwich High Road, London, SE10 8JA
T. + 44 (0)20 8293 6190
@ACF_UK
www.actionagainsthunger.org.uk