

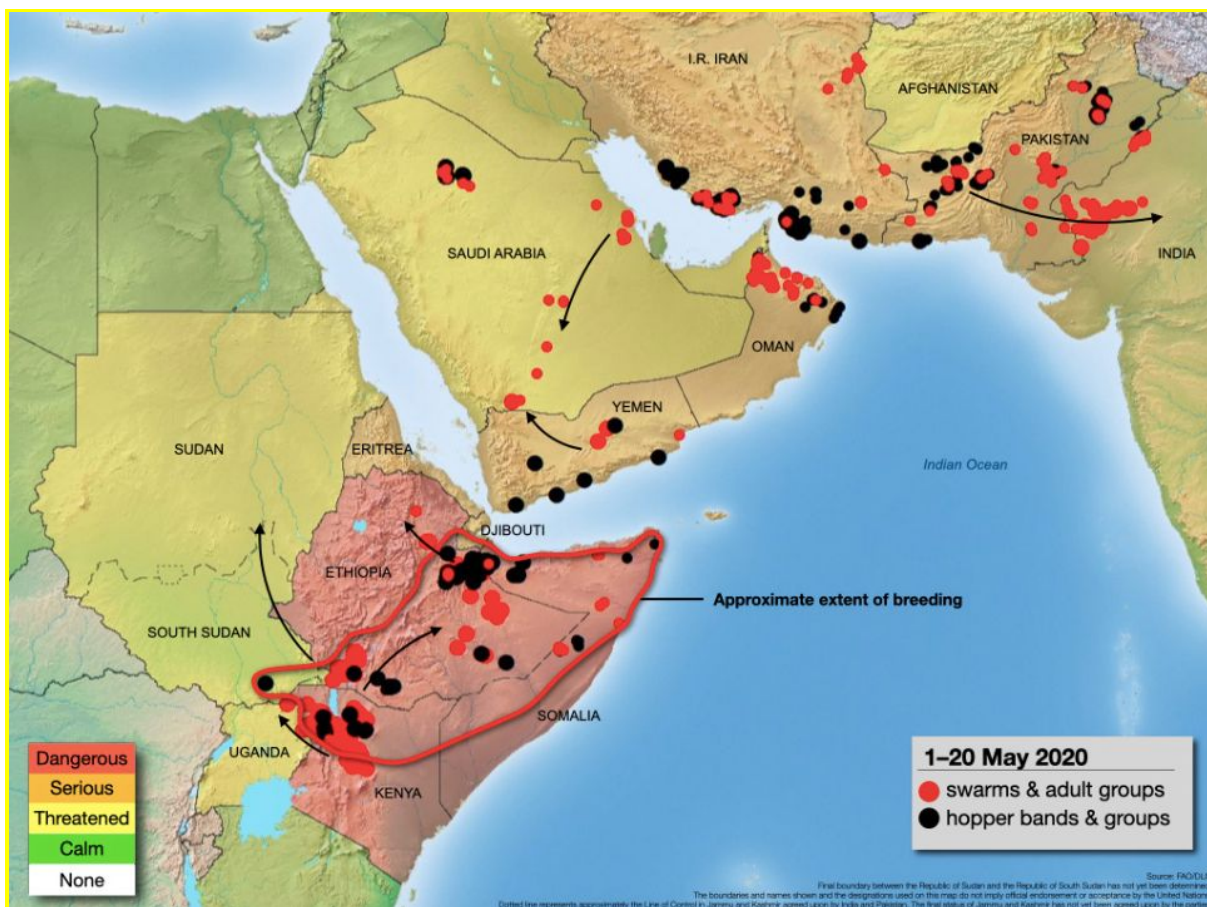
India Locust Outbreak - Climate Change Briefing

The worst locust outbreak seen in a [quarter of a century](#) is currently ravaging West India and is an escalating danger to food security, threatening to spread further east. Several locusts waves are expected from now until early July, due to [spring breeding](#) in southern Iran and southwest Pakistan. The UN warned that the locusts swarm pose a “[severe risk](#)” to India’s agriculture this year. The locusts are currently active in Rajasthan, Gujarat, Maharashtra, Uttar Pradesh and Madhya Pradesh. Rajasthan is currently the most affected state, [according to](#) the Union Environment ministry.

Western Rajasthan and Gujarat are the normal places for desert locusts during the summer (from approximately June to November) but were first spotted by the [Locust Warning Organisation in April](#) this year. More concerningly, they are usually either solitary or in small groups, meaning the current swarming behaviour is [unusual](#).

Expected impacts in India are:

- [Crop vulnerability](#) to attack as sowing season starts for kharif, rice, maize, millet, pulses, soybeans.
- [Damage](#) to the agricultural economy and agricultural workers’ livelihoods.
- [Potential risk](#) to food supply if the outbreak is not contained.



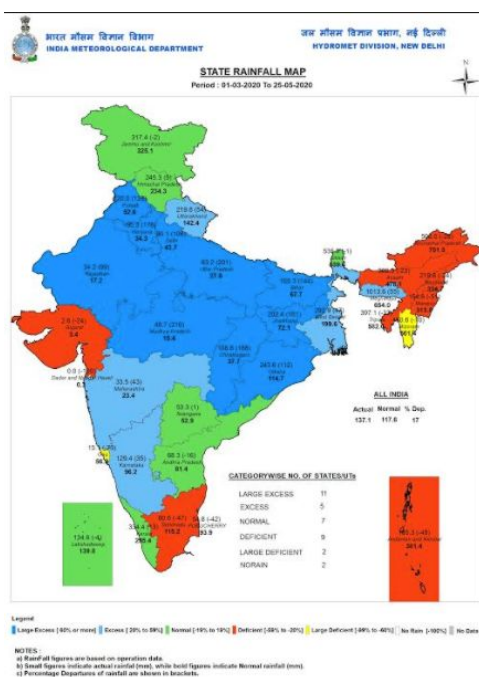
[FAO Situation Summary Map](#)

Link with Climate Change

Climate change [made the weather conditions](#) conducive to the current outbreak (still ongoing in East Africa, see below) [more likely](#), with extreme and unusual weather, including a powerful cyclone season last year, creating the wet conditions that fuelled the outbreak. The same is true in India.

Locusts thrive in [wet conditions](#), and outbreaks [often follow](#) floods and cyclones. Heavy rain leads to growth of vegetation in arid areas, providing locusts with the conditions needed to develop and reproduce, according to the [World Meteorological Organization](#) (WMO).

The 2019 [North Indian Ocean Cyclone season](#) was the most active ever recorded. India has had an [unusual monsoon season](#), lasting 1 month longer than normal, causing extensive flooding and the highest level of Monsoonal rain in 25 years. It has also had an unusual number of [low pressure systems](#) (meaning more rain) linked to an ocean circulation pattern known as the [Indian Ocean Dipole](#) (IOD), which measures the difference in water temperature between opposite sides of the Indian Ocean. The IOD is a primary [driver of climate conditions](#) stretching from Africa to Australia.



[Indian State Rainfall 2019 showing large areas of excess rain](#)

The positive phase of the IOD in 2019 was the strongest for [six decades](#). These conditions led to severe rainfall and flooding in East Africa, as well as contributing to the unusually dry conditions in Australia that drove the current bushfires and the [monsoon extension](#) in India.

The positive phases of the IOD are becoming more common, and scientists believe **climate change is responsible**. Academic studies have found that strongly positive phases of the IOD have happened [more often](#) in recent decades, and that climate change is [behind the increase](#).

As greenhouse gases continue to heat the ocean and the atmosphere, **extreme events caused by the IOD are predicted to become increasingly common**. Unusually positive IOD events could happen nearly three times more often this century if emissions continue to rise, according to a [2014 study](#). A separate [study](#) also found they would be twice as likely to happen even with only 1.5°C of warming - little more than has already been seen.

Increased extremely positive IOD years would likely bring flooding and cyclones like those seen in 2019 to already vulnerable and food insecure regions. Wet conditions could also lead to worse locust outbreaks - in a worst-case scenario they could damage the livelihoods of one tenth of the world's population, [according to](#) the FAO (p2).

Spread from East Africa

The outbreak originated in East Africa and is the [worst upsurge](#) Eritrea, Ethiopia and Somalia have experienced in the last 25 years, Uganda in 60 years and Kenya in 70 years. The outbreak came on the heels of a year marked by extreme droughts and floods in these regions. As a result, the UN [appealed for](#) \$138m to tackle the escalating crisis. The [World Bank](#) recently approved \$500 million in grants and low interest loans to tackle the issue. The [African Development Bank](#) has also approved a \$1.5 million emergency grant.

The current outbreak in East Africa, is [described](#) as 'extremely alarming' by UN Food and Agriculture Organization (FAO), and is threatening food security and livelihoods. The second generation is already hatching and the third generation will hatch in late June/July, coinciding with the harvest season, according to [FAO](#). This can severely threaten the [food security and livelihoods](#) of the region's rural population and fuel famines depending on the magnitude of production losses.

The outbreak is an '[unprecedented threat](#)' to food security according to the FAO, occurring in a region that is already vulnerable to the impacts of climate change. Even before this outbreak, **at least 33 million people in east and south Africa were at emergency levels of food insecurity** as a result of floods, landslides, droughts and cyclones, according to [analysis](#) by Save the Children.

The locust outbreak is [likely to](#) continue to develop to South Sudan, Uganda, Oman, Pakistan, India, Saudi Arabia and Southern Iran, among other countries, threatening livelihoods as it expands. The swarms are [expected to](#) worsen over the coming months as the locusts feed on the new season's crops.

The outbreak, [paired with](#) COVID-19, will [likely aggravate](#) acute food insecurity in an already complex and fragile region. In Somalia, in the period from April–June, the number of acutely food-insecure people was projected to increase by 13% to [1.3 million people](#) due to drought and conflict, while [1.5 million](#) people will likely face a severe food crisis in Uganda for the same reasons. Somalia already [announced](#) a national state of emergency due to the outbreak in February 2020, while [Pakistan declared a national emergency](#) for the second time this year in April.

What are locusts and how are they controlled?

Life Cycle: [Locusts](#) are part of the same family as grasshoppers but under crowded conditions their behaviour and appearance evolve - this is called Phase Change. These crowded conditions are caused by plentiful rainfall and vegetation growth and allow formation of bands of [wingless hoppers](#). If uncontrolled, the [population will increase](#) and the locusts will move to a gregarious state.

When [Phase Change](#) occurs (described as a shift from solitary to gregarious state), locusts no longer act as individuals, but as a swarm. Since gregarious locusts are much more [adaptable](#) to their environment than their solitary type, they tend to cover much bigger areas and are therefore a cause for concern. If two or more regions have swarms, [a plague](#) develops, as has happened in East Africa and India. The [desert locust](#) (currently in India) is present in 30 countries (16 million sq km) in its solitary form but more than 60 (29 million sq km) during plagues.

Prediction and Control: Desert locust biology is dependent on weather, specifically rainfall, temperature and wind.

Rainfall - Eggs, Hopper and Adult stages of development are all [assisted by recent rainfall](#). 2019/20 has been extremely wet for both East Africa and India.

Temperature - Temperature requirements vary based on development stage. Swarms will fly at [15°C when sunny](#) but require warmer temperatures under [cloudy conditions](#) (around 23°C).

Wind - The desert locust is a passive flying species, i.e it typically follows the wind.

Predictions by [NOAA](#) on wind patterns are being used by the FAO to try to predict spread though these are not yet linked to the locust lifecycle. Concerningly, the [prevailing wind](#) in Rajasthan from April to October is from the west. Swarms are unlikely to take off, however, when [wind conditions](#) are faster than 6-7 m/s.

These elements allow prediction/forecasting of locust movement and development and [research](#) is underway to finesse it. Control is generally exercised using chemical pesticide spraying but other suggestions include biological mechanisms such as the [introduction of natural predators](#) or [natural pesticides](#).

In India, locust survey and control are the responsibility of the [Locust Warning Organization \(LWO\)](#) inside the Ministry of Agriculture. India and Pakistan cooperate at the border to share information. Control operations for locusts are [limited by resources](#) and by the [pandemic](#), but a response is underway. Tractor-mounted sprayers and fire vehicles are being used to [spray](#) large areas (see below). The government is also [considering the use of drones](#) for observation and spraying, with restrictions around airports and international borders.

Name of the District (State)	Number of spots treated	Total treated area (Ha)
Jaisalmer (Rajasthan)	22	2114
Sriganganagar (Rajasthan)	57	3220
Jodhpur (Rajasthan)	13	3215
Barmer (Rajasthan)	31	3835
Nagaur (Rajasthan)	4	1020
Ajmer (Rajasthan)	2	235
Pali (Rajasthan)	2	75
Fazilka (Punjab)	19	585
Total	135	14299

Recent Control Data from Ministry of Agriculture

Quotes

January 2020

Keith Cressman, Senior Locust Forecasting Officer, FAO

“As Desert Locust are fully integrated with nature, weather and environmental conditions have dramatic impacts on locust numbers and migration. Historically, heavy rains associated with cyclones that form in the Indian Ocean and make landfall in the Arabian Peninsula and the Horn of Africa have led to Desert Locust plagues.

“In the past few years, there has been a significant increase in the frequency of such cyclones at the beginning and end of the summer period. For example, there were 8 cyclones in 2019 when in most years there are only one or two. Three cyclones in 2018 and two in 2019 have contributed to the current Desert Locust upsurge in the Horn of Africa where large and numerous swarms are present in Ethiopia, Somalia and Kenya.

“If this trend continues, whether it is specifically attributed to climate change or not, is likely to lead to more Desert Locust outbreaks and upsurges in the Horn of Africa.”

January 2020

Professor Axel Hochkrich, Trier University (translated from [original](#) using DeepL)

“Climate change may well play a role here, mainly because, according to forecasts by international climate researchers, precipitation will increase in the southern Arabian Peninsula and northern East Africa. This means that there will be more frequent very humid phases, such as we have had since 2018, and it is therefore possible that such swarms will simply occur more frequently.”

May 2020

Dr Roxy Mathew Koll, Senior Scientist, Indian Institute of Tropical Meteorology and Lead Author, IPCC Oceans and Cryosphere

“The outbreak started after warm waters in the western Indian Ocean in late 2019 fueled heavy amounts of rains over east Africa and the Arabian Peninsula. These warm waters were caused by the phenomenon called the Indian Ocean Dipole—with warmer than usual waters to its west, and cooler waters to its east. Rising temperatures due to global warming amplified the dipole and made the western Indian Ocean particularly warm.

Heavy rain triggers the growth of vegetation in arid areas where desert locusts can then grow and breed. These locusts which migrated to India early this year might have found greener pastures as the pre-monsoon rains during March–May were in excess over north India this year (see the IMD rainfall map, above).

May 2020

Ajayvir Jakhar, Chairman, Bharat Krishak Samaj (Indian Farmers' Forum)

"India's central government has to go beyond giving alerts and advisories on managing the locust outbreak, and immediately arrange for aerial sprays of pesticides to control the rapidly escalating situation. The states do not have the wherewithal to manage the scale of the outbreak this year."

May 2020

Devinder Sharma, Agriculture & Trade Policy expert

"The situation is escalating too rapidly and is extremely serious. The swarms have now reached 5 states - Rajasthan, Gujarat, Madhya Pradesh, Uttar Pradesh and Maharashtra. Locusts leave a destruction worse than drought, not only are the crops destroyed but even trees collapse under their weight. This year the locusts are breeding 400 times more than usual due to the favourable climatic conditions brought on by the untimely rains and increased cyclonic activity. The government preparedness has been too slow to keep up with this rapid increase. They must step up support. This is an emergency situation and requires emergency measures. These desert locusts will not only leave a severe impact on India's food production but also deal a double whammy to the farmers who were already reeling from the economic downfall of the lockdown due to COVID-19."

