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Locust Invasion in India

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Locust Invasion in India

Introduction

It has been a double whammy. As the nation is reeling under the effects of COVID-19 pandemic, India has to fight another menace: locust invasion. Massive swarms of desert locusts have devoured crops across seven states of western and central India including Rajasthan, Gujarat, Madhya Pradesh and Haryana, Maharashtra, Uttar Pradesh and Punjab. The locust population might grow 400 times larger by end June 2020 and spread to new areas without action. It would be disrupting food supply, upending livelihoods and require considerable resources to address. India is facing its worst desert locust invasion in nearly 30 years.

Climate change is a crucial driver of the current locust plague. Locust swarms are wreaking havoc on crops and pastureland, destroying food and vegetation and adversely affecting food security and livelihoods for millions of people. The impacts on economy, human, and environment are substantial. When basic needs such as food and shelter, nutrition, health care and education are not met it affects households and families hindering long-term health and development, especially of children¹.

Desert locusts have swamped around 35,000 hectares of land in India's seven states threatening some vegetable and pulse crops.

As it is the lean season, the government and agricultural experts do not foresee major crop damage for now notwithstanding large-scale infestations. The lean season is the gap between the previous harvest and the next planting season. By June monsoon rains will spur rice, cane, corn, cotton and soybean sowing. In the next couple of weeks the central and state governments will have to curb fast-spreading swarms in their tracks to ensure that swarms do not end up devouring summer crops.

In addition to the COVID 19, super cyclone in West Bengal this locust invasion is a major challenge to the nation now.

What is this Desert Locust?

The Desert Locusts belong to a family of grasshoppers called Acrididae. The Desert Locusts, the world's most destructive migratory pest are known to change their behaviour and form swarms of adults or bands of hoppers (wingless nymphs). The swarms containing millions of locusts that are formed can be dense and highly mobile and can have devastating impacts on crops, pasture and fodder. Locusts do not attack people or animals.

Historically, the Desert Locust has been a major hazard to human beings. The Desert Locust is mentioned as a curse to mankind in ancient writings. Locusts cause destruction by devouring the leaves, flowers, fruits, seeds and bark².



Life span of Desert Locust is a total of about three to five months. It depends mostly on weather and environmental conditions. The life cycle includes three stages: egg, hopper and adult. Eggs take about about two weeks to hatch, hoppers develop over a period of about 30-40 days and adults mature from two to four months³.

After every three months, adults are ready to lay eggs again. Locusts breed very fast. A single female locust can lay egg pods containing around 80 to 150 eggs. While many die, for every single female locust, there are 20 locusts of the new generation which make it. It is an exponential increase. Every three months, they multiply by 20 times. Every six months, 400 times and every nine months 8000 times. Soon swarms of billion locusts are formed.

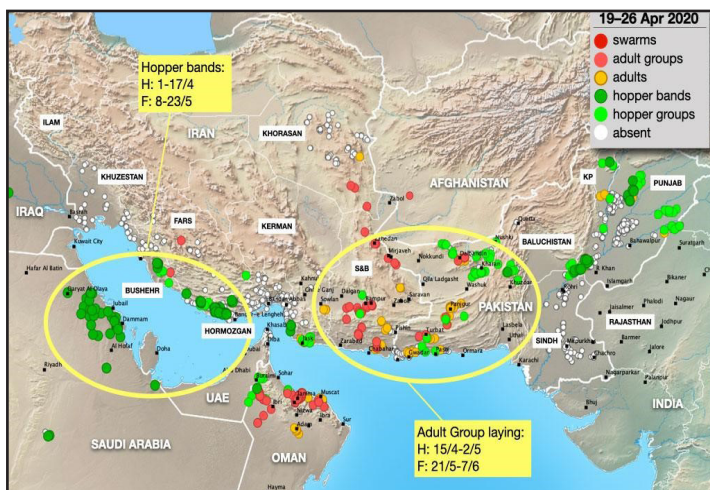
Locusts can move up to 90 miles a day, form a billion strong swarms and eat the same amount of food per day as 35,000 people, according to reports. Larger swarms, can consume 1.8 million metric tons of green vegetation every day, enough food to feed 81 million people.⁴

Swarms travel in the direction of the wind at the same wind speed. It can cover a maximum distance of up to about 150 km/day. Before they start, a settled swarm warm up in the early morning by basking in the sun. After that swarms fly all through the day until sunset when they land and stay put on the ground throughout the night. Swarms can only be treated in the early morning before take-off or in the late afternoon once they have landed.

Global Phenomenon

The outbreak is evolving quickly. Swarms of desert locusts are threatening large areas of pastures and crops in countries in the Horn of Africa, the Middle East and South Asia. The UN Food and Agriculture Organization (FAO) says these swarms represent the worst infestation in 25 years in Ethiopia and Somalia, in 26 years in India and the worst in 70 years in Kenya. As of mid-April 2020, 23

countries have been infested: nine in the wider East Africa region, 11 in North Africa & the Middle East and three in South Asia. Locust attacks have already ruined pastures, crops and pastureland in African countries of Ethiopia, Kenya, Somalia, Eritrea and Djibouti. The migratory pests have entered into Tanzania, Uganda and South Sudan, wiping out entire fields of maize, sorghum, and wheat crops. Locust swarms are jeopardising food security across Africa, the Arabian Peninsula and parts of South Asia. This is a single global outbreak, and it could cover 20 per cent of the earth's landmass. As per the World Bank estimates, in Africa alone, more than 90 million hectares of cropland and pasture are at risk and damages and losses could amount to US\$9 billion in coming years. The current locust attack has been categorised into three regions across the world by the FAO: The eastern region, including India, Pakistan, Iran and Afghanistan, the central region including countries in the Horn of Africa and the western region including West African countries⁵.

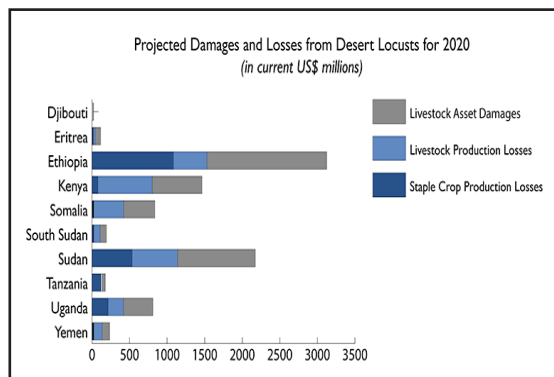


Source: DTE Staff Down to Earth, May 26, 2020 <https://www.downtoearth.org.in/news/climate-change/9-maps-to-show-how-locusts-have-come-to-threaten-india-71373>

Seriousness of this outbreak. The above-average rainy season in March and April in the East Africa region created favourable conditions for locusts to breed. If left unimpeded, the number of desert locusts could grow by 400 times by June. Food security and livelihoods for millions of people are at stake, especially in countries marked by Fragility, Conflict and Violence (FCV). The Horn of Africa, with 22 million severely food insecure people and over 12 million internally displaced persons, is facing a critical food security emergency unless urgent action is taken to control the locust population. The impact on the food cycle could drastically threaten livelihoods, erode people's savings and push people further into poverty.

Potential impact of the outbreak. This locust invasion overlaps with the long rainy season and comes at a time when farming communities are preparing to harvest their crops. The current state of affairs could affect their living and their survival in the next few months. It has a long term impact on affecting their ability to rebuild savings, regrow crops and livestock and to weather future shocks.

If suitable action is not taken now, the locust population will swell exponentially. They are projected to grow by up to 400 times their current numbers by June and potentially spread to new areas, including West Africa, when crops are ready to be harvested.



Source: Chart, S. D'Alessandro/World Bank

Current Situation. The locust outbreak in the time of COVID-19, is a crisis within a crisis which is putting the food security and employment of millions of people at risk. The COVID-19 pandemic will make things even more difficult. Already, disrupted supply chains are holding up the delivery of locust control equipment and slowing down access to important materials and services. Response teams are finding it difficult to reach areas that desperately need their advice and expertise due to lockdowns and travel restrictions. In spite of all the problem of being stretched out and challenged by the pandemic, it is vital to act now to prevent further devastation and the threat of a multi-year famine. The developed community must stand with them to offer support⁶.

Effect of Climate Change

The key driver of the current locust plague is climate change. Swarms of desert locusts are not a recent phenomenon. It has been happening for centuries. The difference today is unusual weather conditions which generated strong cyclones and heavy rains in the Arabian Peninsula. It caused higher than normal vegetation growth, ideal conditions for locusts to feed on and surge. Roxy Mathew Koll, a climate scientist from Indian Institute of Tropical Meteorology, said, “These warm waters were caused by the phenomenon called the Indian Ocean Dipole(IOD) 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.”⁷

Koll said that heavy and protracted rainfalls over the west coast of India during the latter half of the monsoon and unusually strong cyclones during the post-monsoon season, may have links with these warm ocean temperatures in the west Indian Ocean region.

“Cyclones draw their energy from the ocean and hence such

an environment is quite favourable for an increased number of cyclones. Another weather phenomenon called the Madden Julian Oscillation (MJO), a band of eastward-moving convective clouds, was also quite active in the Indian Ocean when the IOD was at its peak. Besides, our recent research shows that the rapid warming in the Arabian Sea has resulted in a threefold rise in widespread extreme rains, leading to large scale floods, along the west coast and parts of central India⁸,” said Koll.

The positive phase of the IOD in 2019, the strongest for six decades, led to heavy rainfall and flooding in East Africa. It contributed to the unusually dry conditions in Australia that drove the current bushfires.

According to FAO, increased extremely positive IOD years would likely bring flooding and cyclones like those seen in 2019 to already vulnerable and food-insecure regions. Damp 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.

Keith Cressman, Senior Locust Forecasting Officer, Food and Agriculture Organisation (FAO), said adverse weather conditions are directly linked with locust plagues. “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 eight cyclones in 2019 when in most years there are only one or two. If this trend continues, whether it is explicitly attributed to climate change or not, is likely to lead to more Desert Locust outbreaks and upsurges in the Horn of Africa.”⁹

Cressman is of the opinion that three cyclones in 2018 and two in 2019 have contributed to the current Desert Locust expansion in the Horn of Africa causing presence of large and numerous swarms in Ethiopia, Somalia and Kenya. Perfect conditions for locusts to breed and spread were formed by a prolonged stretch of unusually wet weather, including several rare cyclones that hit eastern Africa and the Arabian Peninsula over the last 18 months. The apprehension is: locust swarms will be a regular affair as oceans warm and more frequent tropical storms create favourable breeding conditions.

University of Trier biodiversity scientist Axel Hochkirch said, “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 frequently¹⁰.”

Impact of COVID-19

The overlap of COVID-19 pandemic with locust crisis has created a crisis within a crisis. The COVID-19 pandemic on its own may create a severe food security crisis in Africa and elsewhere. Due to COVID-19 food supply chains are already facing disruptions, reduced access to inputs and services, transport and roadblocks, labour movement and credit or liquidity. The pandemic is disturbing the supply chains for pesticides and other pieces of equipment needed to control the spread of locusts.

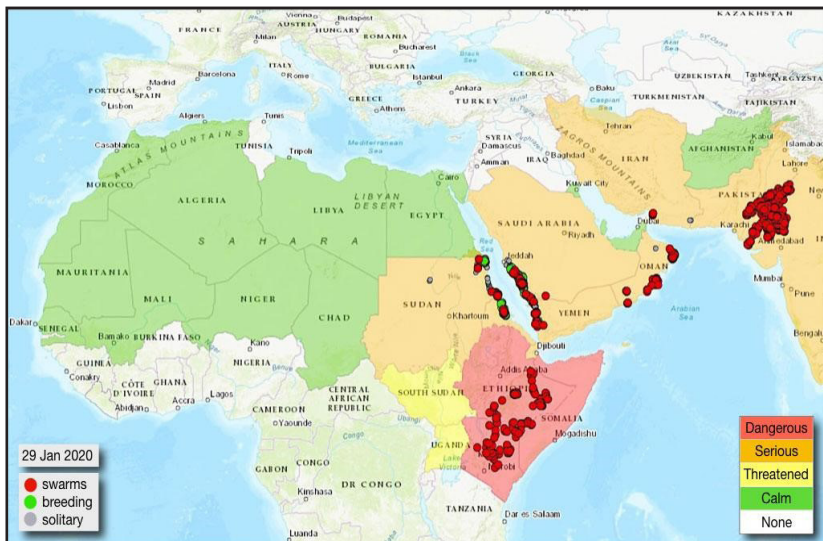
There are considerable constraints. Inter and intrastate border closures and delays posed by quarantine measures are imposing restrictions on the movement of personnel and equipment to fight the locust invasion. Particular care needs to be taken to decrease the threats to the aid workers and control officers of spreading the

virus to isolated rural locations where locust control operations take place. Where Banks are financing responses, bank teams and the communities they engage should be protected.

These two crises, taken together have the potential to generate the conditions for famine, disease and increased poverty. Since COVID 19 is taking the entire spotlight, it should not take away the danger of locusts. This should not become a forgotten cause. COVID 19 and the locusts together can take a country to the bottom of the ladder.

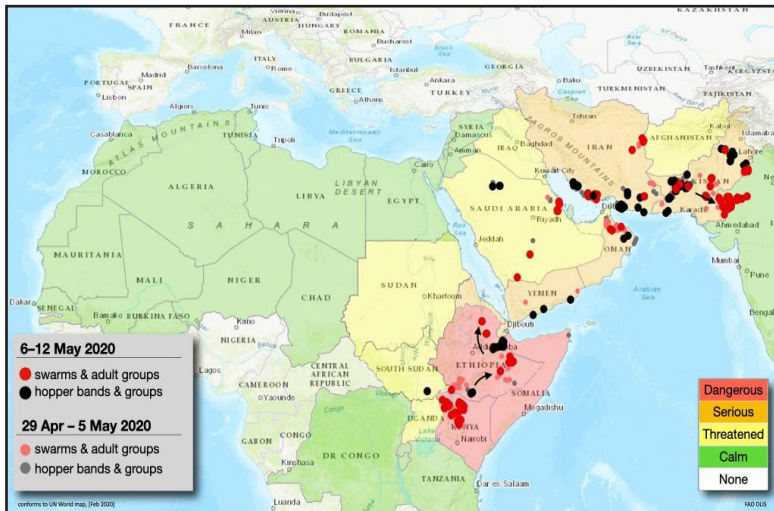
How the Swarms Moved

The following maps from the Food and Agriculture Organization of the United Nations tell the story of the recent spread of locusts spanning two continents. This is as on 29 January 2020.



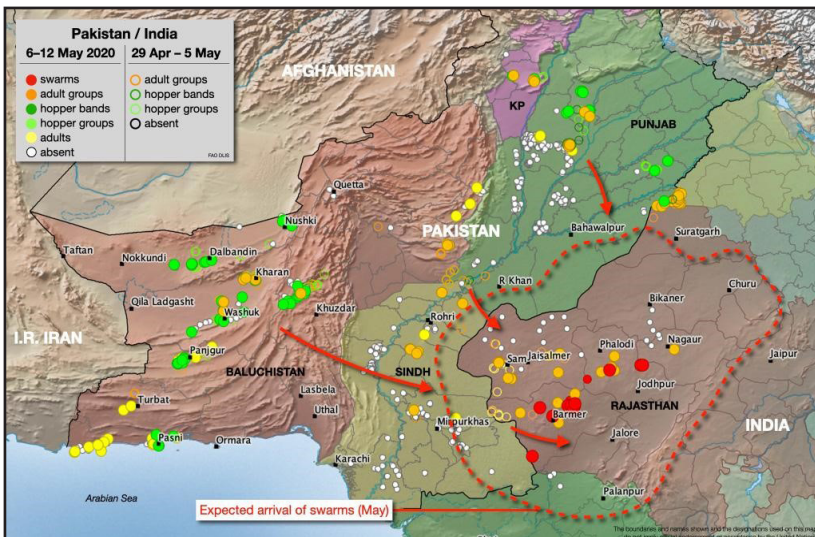
Source: DTE Staff Down to Earth, May 26, 2020 <https://www.downtoearth.org.in/news/climate-change/9-maps-to-show-how-locusts-have-come-to-threaten-india-71373>

As on 12 May 2020, the situation was like this.



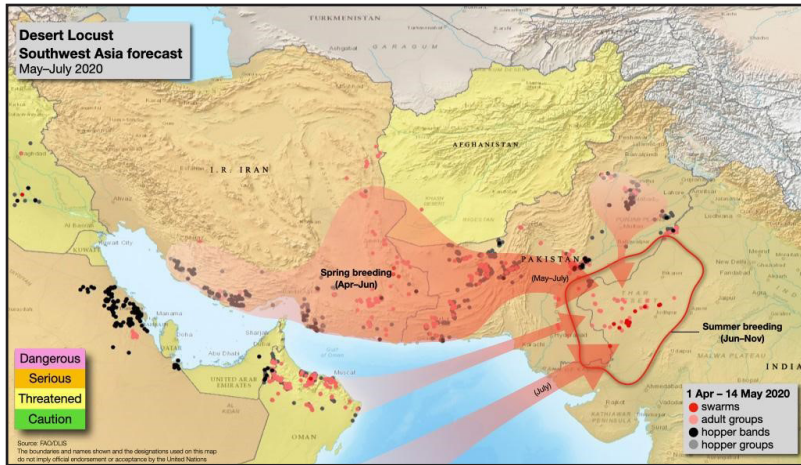
Source: DTE Staff Down to Earth, May 26, 2020 <https://www.downtoearth.org.in/news/climate-change/9-maps-to-show-how-locusts-have-come-to-threaten-india-71373>

As on 12 May 2020



Source: DTE Staff Down to Earth, May 26, 2020 <https://www.downtoearth.org.in/news/climate-change/9-maps-to-show-how-locusts-have-come-to-threaten-india-71373>

Wind and rainfall have made the conditions for the movement of the locusts into areas that are generally not impacted by them. Forecast for May to July 2020 is:



Source: DTE Staff Down to Earth, May 26, 2020 <https://www.downtoearth.org.in/news/climate-change/9-maps-to-show-how-locusts-have-come-to-threaten-india-71373>

Mitigation Measures

Actions to avert food crisis.FAO recommends the following anticipatory actions to avert a food crisis:

- **Curb the spread of locusts.** Institution of assessment, early warning and forecasting, ground surveillance and impact assessment mechanisms and establishment of locus control organisation both aerial and ground. Monitor and control locust population growth and curbing the spread of swarms while mitigating the risks associated with control measures. Augment government capacities in terms of ground and aerial operations for spraying of pesticides. Ensure the supply of pesticides, supply chain management and improve livelihood protection activities. Look after the pastures

which are important for animal husbandry activities. Locusts do not discriminate between farmland and pastures.

- **Safeguard livelihood.** Protect and restore the livelihoods of locust affected households. Ensure food security, prevent human capital and asset loss and rehabilitate livelihoods. Give cash incentives to the farmers, provide supplementary livestock feed and farming input packages.
- **Coordination.** Deploy rapid surge support, intervention and coordinate cross border response. Improve national security. Strengthen national and regional capacity for surveillance and control operations to facilitate early warning and early response

The complete data should be digitised and made available for anybody interested. Geographic Positioning System or GPS, a low-cost, hand-held gadget that determines your latitude and longitude position anywhere in the world must be made use of by workers in the field. It can improve the accuracy of identifying the locations of infestations and help in control operations.

Difficulties in controlling desert locusts. Reasons for difficulty to combat the Desert Locust are¹¹:

- Vast area (16-30 million sq. km) within which locusts can be found,
- Remoteness and inaccessibility to such areas,
- Inadequate resources for locust monitoring and control in some of the affected countries,
- Insecurity or lack of safety in some areas,
- Undeveloped basic infrastructure of roads, communications, water and food in many countries,

- During the long periods when there is little or no locust activity, it is difficult to maintain a sufficient number of trained staff and functioning resources,
- Political relations amongst affected countries,
- Difficulty in organising and implementing control operations in which the pesticide must be applied directly onto the locusts,
- Due to lack of periodicity of such incidents and the uncertainty of rainfall in locust areas difficulty in predicting outbreaks.

Control of locust swarms. Locust swarms are fast movers. They are erratic in their movements. To contain their growth and spread is a challenging task. One of the methods to reduce their propagation and prevent their spread to new areas is the safe and efficient use of pesticides, including biopesticides, through aerial and ground spraying. FAO is the leading technical agency globally on desert locust control. The World Bank is coordinating closely with FAO and other partner organisations and countries to develop integrated pest management plans and support countries to undertake safe and effective control operations. FAO is the lead responder organisation and provides important technical assistance to affected countries. External assistance is generally required from the international community and other international organisations during outbreaks¹².

Ways to Control Locusts

To minimise detrimental effects on livestock fodder banks and human cropland locusts are controlled by:

- Chemical sprays. At present mainly organophosphate chemicals are applied in small concentrated doses known as ultra low volume (ULV) formulation by vehicle-mounted and aerial sprayers and to a

lesser extent by a knapsack and hand-held sprayers. If the pesticide is selected carefully then the impact on other insects/birds and mammals can be minimised.

- Using the locusts as a feed source for people and / or livestock or fish feed. Locusts are a high protein source – they can be captured, dried and eaten.

Non chemical ways to kill locusts. Extensive research is being carried out on biological control and other means of non-chemical control of locusts. The current focus is primarily on pathogens and insect growth regulators. Since locusts can quickly get away from its natural enemies control by natural predators and parasites is limited. Even though giant nets, flamethrowers, lasers and huge vacuums have been projected earlier, these are not in use for locust control. People and birds often eat locusts. But these are not enough to significantly reduce population levels over large areas.

Existing Arrangement in India

As per the Contingency Plan for Desert Locust Invasions, Outbreaks and Upsurges issued by the Ministry of Agriculture and Farmers Welfare, Government of India in June 2019, Locust Warning Organization (LWO) carries out regular surveys in the scheduled desert area of Rajasthan and Gujarat to monitor the presence of desert locust and ecological conditions.

It has directed for Pesticide use is Malathion 96% ULV for Desert Locust control. “A buffer of minimum 5000 liters of Malathion 96% ULV is maintained at specific locations from where pesticide can be mobilised for immediate requirement. In 2014, an agreement was signed with Hindustan Insecticides Limited (HIL) with the provision that the company will supply the required quantity of pesticide. M/s HIL will keep ready stock of 8000 litres Malathion as technical reserve. On receiving demand from HIL will supply the

desired quantity of Malathion 96% ULV formulation to the Locust Circle Offices within 7-10 days of the supply order. However, in case of requirement of a larger quantity of Malathion 96% ULV, HIL needs 25-30 days to supply the pesticide”¹³.

Aircraft for locust control. Government of India does not have its own aircraft for locust control operations. However, in case of emergency requirements efforts will be made through the concerned Ministries for the supply of aircraft with spraying kits for desert locust control purpose. When aerial control operations are required, Joint Secretary (Plant Protection), Government of India is the authority for execution of contingency plan.

Present Condition

India is familiar with locusts especially in North West part of India. India has seen a variety of locust plagues and upsurges since 1812 to 1997. India has more than two hundred years of experience in handling the locust swarms. The Britishers encouraged systematically collecting and recording data regarding locust occurrences. The British encouraged entomologists to research locusts with the hope of understanding this phenomenon.

After the 1927-'29 locust outbreak that ravaged the central and western parts of India the Standing Locust Committee in 1929 and the Central Locust Bureau was formed in 1930. This led to the establishment of the Locust Warning Organisation in 1939.

However, no locust upsurges have taken place since December 2011. This year's locusts attack is worse in 26 years. Scientists say these locusts are different.

Locusts are common in the state of Rajasthan. This year for the first time they have penetrated to the states of Madhya Pradesh and Uttar Pradesh since 1993 and the state of Maharashtra since 1974.

The affected states are: Gujarat, Rajasthan, Maharashtra, Madhya Pradesh and Punjab, Haryana and Uttar Pradesh. The locusts have been found in 41 of India's 739 districts. The pests have devoured almost 50,000 hectares or 123,500 acres of agricultural land in seven states. Scientists are of the opinion that recent locust attacks may have happened due to excess rain in March, April and the first half of May 2020. The situation could worsen since more swarms are expected to reach India via Pakistan from the Horn of Africa in June.¹⁴

KL Gurjar, Deputy Director, Locust Warning Organisation said, "Eight to 10 swarms, each measuring around a square kilometer (0.39sq miles) are active in parts of Rajasthan and Madhya Pradesh. This time the attack is by very young locusts who fly for longer distances, at faster speeds, unlike adults in the past who were sluggish and not so fast," "Their swift movement is aided by dust storms, whose frequency increases during the dry summer months. The movement of the swarms depends on the winds, which are blowing west to east and a little south now. That could put the swarms in India's central region very soon. Already, they have reached till Panna in MP, one of India's renowned tiger reserves, Panna National Park.

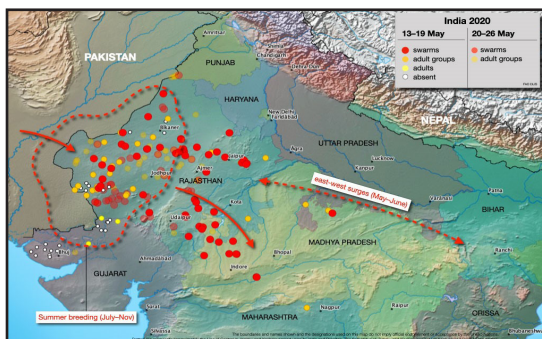


Swarms of locust in the walled city of Jaipur, Rajasthan, Monday, May 25, 2020
| PTI

State of affected areas in different states is as under;

- Around 38,308 hectares in 22 of 33 districts in Rajasthan are under locust attack.
- After attacking crops in Madhya Pradesh, a swarm of locusts reached Uttar Pradesh's Jhansi district. Other districts in the region are also put on alert.
- The swarms stretching up to 17 km in length had entered farms in Fetri, Parseoni, Khangaon and Katol in Nagpur district and in Ashti taluka in Wardha district. Might move towards Ramtek city.
- Punjab is on high alert for the infestation. Control rooms have been established in each district and farmers have been asked to report any activity of locusts.

More locusts could arrive from Africa in June. The FAO, in a bulletin on May 21, 2020 stated, rain in early June along the India-Pakistan border would aid the laying of locust eggs. There is also a concern that the locusts already in India could breed. "It is an alarming situation. But we are more worried about their breeding. If that happens, it could be devastating for our farmlands."



Source: DTE Staff Down to Earth, May 26, 2020<https://www.downtoearth.org.in/news/climate-change/9-maps-to-show-how-locusts-have-come-to-threaten-india-71373>

There are serious concerns of food and economic security of arid and semi-arid regions as well as agricultural powerhouses as sowing season for kharif or monsoon crops like rice, maize, millet, pulses, soybean, and groundnut are in Jun. The locusts have not impacted rabi (winter) crop, but the government efforts are on to eradicate the pests before the monsoon in order to save kharif crops. Though the rabi crop has been harvested this year, locusts can still endanger the sprouting cotton crop, vegetables, and fodder sown last month. Farmers are worried about the damage they can cause to the tender millet and moong dal crops that are being prepared to sow now.

The Indian government wants to tackle this problem regionally. India has offered Pakistan with pesticide to spray on its side of the border. India has made the same offer to Iran also¹⁵.

Response of Indian Government

While the lead government agency to fight against Desert Locust emergency is LWO, other ministries such as Home, Defence, External Affairs, Civil Aviation, Communication, State departments and relevant stakeholders should be engaged during the locust control/locust emergency¹⁶.

Locust Warning Organization maintains a permanent presence monitoring movements along the Indo-Pakistan border in the plains. It's a strategic task for saving the country's rich croplands in the east. The last serious offensive of the organisation was in late June 1993, when insecticides were sprayed by aircrafts on swarms arriving from the Arabian Peninsula.

India has a well-conceived contingency plan for Desert Locust Invasions, Outbreaks and Upsurges, duly updated as on June 2019. However, the magnitude of the locust attack the nation is facing is not within the capability of LWO. All the concerned agencies have to come forward in a coordinated manner to combat this threat¹⁷.

The contingency plan includes a control strategy to reduce the frequency, duration and intensity of plagues. Before the situation becomes out of control the strategy comprises regular surveys to provide early warning and contingency planning to allow an early and effective response.

Awareness campaigns have been carried out in affected states to sensitize farmers. Pamphlets and stickers are being distributed to draw attention to pest prevention measures. Messages are being hand painted on the walls of offices, warehouses and granaries across affected states. The government has increased the LWO workforce and bought new equipment and vehicles to survey and spray insecticides.

Measures undertaken by the government

The government has been quick to respond to the threat with pesticides and sprayers mounted on vehicles. Reports suggest that, till May 27, sprinkling operations were conducted in 303 locations spread over more than 47,000 hectares in 21 districts of Rajasthan, 18 in Madhya Pradesh, two in Gujarat and one in Punjab. The Ministry of Agriculture has initiated measures to deploy drones to spray insecticides on affected areas.¹⁸ An order of 60 new spraying machines has been placed and preparations of the aircraft for spraying are underway. The machines coming from the UK-based company Micron are expected around June 11 or 12 and the rest of the consignment will come by June-end. The aerial kits will come later on. Two firms have been identified for the supply of drones for aerial spraying of insecticides. At present as per requirement, 89 fire brigade vehicles for pesticide spray, 120 survey vehicles, 47 control vehicles with spray equipment and 810 tractors mounted sprayers have been deployed for effective locust control.

Presently, the Locust Control Offices have 21 Micronair and 26 Ulvamast spray machines which are being utilized for locust control. Supply order for procurement of an additional 55 vehicles has been placed to strengthen the locust control efforts. Adequate stock of pesticide Malathion has been maintained at Locust Control Organisations¹⁹.

The government is using specialised spraying machines and has set up 11 control rooms to coordinate the response. Agriculture Minister Narendra Singh Tomar is closely monitoring the situation and held three meetings with state agriculture ministers and representatives of pesticides companies.

The LWO has assured that the situation is under control. The agency has identified four large swarms of locusts: two in Madhya Pradesh, one in Rajasthan and the other near Jhansi in Uttar Pradesh in the country. These are between two and three square kilometres in size. Another swarm, smaller than one square kilometer, had attacked Vidarbha on 25 May.

Weekly virtual meetings in association with the FAO are held with four countries -- India, Pakistan, Iran and Afghanistan. Locusts breeding in Pakistan often moves to India. To minimise the damage, India would need cross border co-operation with Pakistan. To review the situation officials from Indian and Pakistan hold weekly meetings via video conferencing. Six times a year, delegates from both sides of the border meet to discuss pest breeding patterns and control strategies, monitoring reports and local forecasts.²⁰.

Pradhan Mantri Fasal Bima Yojana (PMFBY). In addition to spraying of pesticides through vehicle-mounted sprayers, states have notified locust invasion as “mid-season adversity” under the Pradhan Mantri Fasal Bima Yojana (PMFBY) and announced disaster relief packages.

Currently Rajasthan is the worst affected state due to the locust attack. Rajasthan government has decided to provide farmers who are insured under the PMFBY with advance payment of 25% of their likely claims. This will be implemented in six districts of Barmer, Jaisalmer, Jodhpur, Jalore, Bikaner and Sirohi.

The farmers in Rajasthan are also being provided relief as per the State Disaster Response Fund (SDRF) norms.

In January, the Rajasthan government declared payment of Rs 13,500 per hectare, but with a ceiling at two hectares, to all farmers in four affected districts of the state: Barmer, Jaisalmer, Jalore and Jodhpur. However, farmers have said that the amount is insufficient, as it covers only one-fifth of the total cost of cultivating a crop on one hectare of land.

However reports²¹ have showed that the procedure for claiming the crop insurance is quite cumbersome. It is as under:

- Joint survey by the concerned insurance company and representatives of the state government will be conducted.
- The balance of the claims will be disbursed only after crop cutting experiments (CCE).
- The CCE process has drawn flak as it calculates damages based on random selection of any four fields growing the crop for which the CCE is being conducted. Locusts don't damage fields in a village uniformly.
- Farmers in remote locations mostly don't take loans from banks to cultivate crops. Hence they are not insured under the PMFBY.

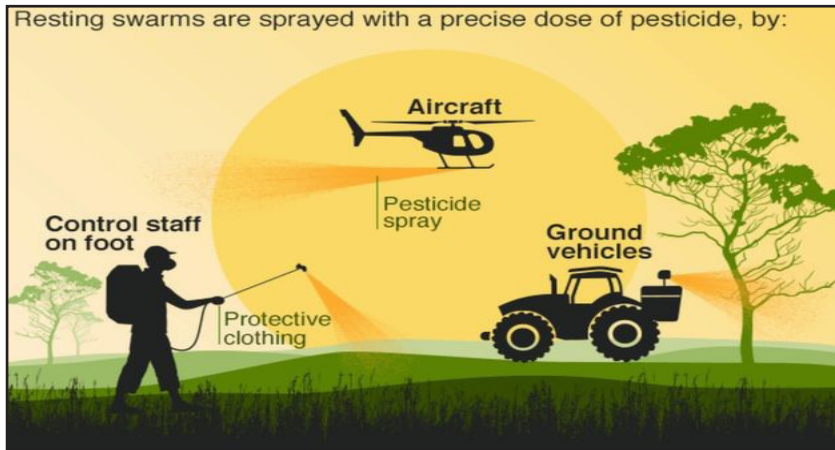
- It is not clear whether the farmers would get mid-season adversity claim as well as relief under the SRDF's guidelines.
- Loss intimation order has to be issued within seven days from the adverse seasonal event to the insurance agencies.

“If selected fields for CCE haven't suffered locust attacks, all the insured farmers of that patwar circle wouldn't receive any compensation under the PMFBY,” Dalip Bhamboo, a farmer associated with the All India Kisan Sabha (AIKS) in Hanumangarh district told The Wire.

According to the data of the agriculture department, the cost of cultivation per hectare for wheat crop in Barmer, Jaisalmer, Jalore and Jodhpur in the current Rabi season is Rs 34,500, Rs 41,000, Rs 45,500 and Rs 40,000 respectively. A farmer in Jaisalmer who would have spent Rs 41,000 per hectare to cultivate wheat crop this Rabi season, would receive only Rs 13,500 as compensation for the crop loss suffered due to the locust attack.²²

Action by Farmers

As always India's farmers have taken recourse to various innovative means, jugads, to thwart the locust menace. The farmers have resorted to banging steel plates, whistling, lighting fires, scarecrows, making a loud sound like playing DJs at very high volume, bursting firecrackers, burning tires and throwing stones to drive the locusts away. They realise that birds like kites, crows, storks, starlings, peafowls, and rosy starling fed on locusts. They could help limit the locust population. They plough the fallow lands where locusts were resting: the escaping insects became an easy target for birds. Pigs, toads, snakes, ground beetles and parasitic flies are known to be effective in checking the locust population.



Source: <https://www.bbc.com/news/world-asia-india-52804981>

Insecticides may give short-term relief during an infestation. However, they also endanger the birds that act as natural predators of locusts. From the point of view of environmental protection, using predators is better than spraying insecticide. The insecticide would cost more and create pesticide residues. Predators would cause no environmental pollution and would be good for the food chain.

Use of pesticide can often be counterproductive. The chemicals not only harm crops but also fail often to keep locusts at bay. It is too expensive to buy all these types of equipments for spraying the chemicals..

Using tractors to spray malathion is not always effective. In far-flung desert areas, tractors can't move across sand dunes or reach out to the height of certain trees, rendering the spraying ineffective. The government must use drones or aircraft to spray Malathion over locusts swarms for effective results. The drones have very limited capability of endurance and to lift insecticides.

Chickens and ducks have higher “combat” capabilities than frogs and birds. Ducks are a better choice than chickens as they live in groups and can be easily managed. They are more resilient and better able to forage, more resistant to cold and able to survive in the wild. A chicken can eat about 70 locusts a day. A duck is three times stronger and can eat more than 200 locusts a day. Chinese have been using Duck Army successfully to control locusts.

Conclusion

In the middle of the corona virus pandemic, a recent killer cyclone, dwindling cash reserves and close to 100 million people out of work, India has to fight another battle against the swarms of locusts that have entered the western parts of India. They have already made their way into Rajasthan, Gujarat, Madhya Pradesh, Maharashtra and Uttar Pradesh.

These desert locusts are voracious eaters and are now multiplying at an astonishing 400 times their usual rate, thanks to favourable climatic conditions. Swarms of locusts are threatening to be the next big problem for agriculture in India, especially western India. If not managed properly, this can lead to a major problem of food security of the country.

Loss of pasture land will cause great distress to nomadic communities, banzaras and people who depend on animals for their livelihood. Generally they are at the bottom of the pyramid. Their interests must be safeguarded first. Is there any insurance scheme for them? How do they get access to the benefit schemes?

The government is aware of the risk of swarm invasion as the country faces onset of the seasonal monsoon. While the Centre, state governments and stakeholders have initiated a number of actions, an integrated battle must be fought to win over this locust invasion.

Locust menace has no quick-fix solution²³. Chemicals, pesticides, drones and aircrafts do not provide any permanent solution. It is crucial to address the root cause of global warming and invest in upgrading climate resilience and adaptation techniques. This is an expensive and complex process, which will require global cooperation and coordination. But it has to be done. Else, as these destructive pests have demonstrated, the costs will be staggering and recurring.

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