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Report of Monitoring and Assessment of Desert Locust in Africa and Asia

Early August 2020

Desert Locust monitoring and loss assessment in three Southwest Asia countries

Overview

Integrated with multi-source Earth Observation data, e.g. meteorological data, field data, and remote sensing data (such as GF series in China, MODIS and Landsat series in US, Sentinel series in EU), and self-developed models and algorithms for Desert Locust monitoring and forecasting, the research team constructed the 'Crop pests and diseases monitoring and forecasting system', which could regularly release thematical maps and reports on Desert Locust.

This report focuses on the dynamic update of Desert Locust monitoring and loss assessment in Pakistan, India, and Nepal. The results showed that, in July 2020, Desert Locust in Pakistan newly harmed about 628.3 thousand hectares of vegetation area, Desert Locust in India newly harmed about 957.7 thousand hectares of vegetation area. Since Desert Locust invaded Nepal on June 26, 2020, it has harmed about 70.1 thousand hectares of vegetation in the territory. At present, locusts in the summer breeding area on the Indo-Pakistan border continue multi-generation breeding. It is expected that the first generation of summer locust swarms will be formed in mid-August and the second generation of locust swarms will be formed in September. The density of locusts in Nepal is relatively low and is not expected to cause major damage. The period from August to September coincides with the important crops growing season or harvesting season in Pakistan and India. If not properly controlled, locusts will bring a major threat to agricultural and pasture production. It is necessary to continue the

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monitoring and early warning of the intercontinental Desert Locust plague, and organize joint prevention and control in multiple countries, ensuring the safety of agricultural and pasture production, as well as regional stability.

Monitoring and assessment of Desert Locust in Pakistan

In July 2020, desert locusts in southwestern Pakistan continued to migrate to the summer breeding area on the Indo-Pakistan border. There were still a small number of locust swarms in the southwest Pakistan, and the desert locusts on the Indo-Pakistan border hatched and reproduced in large numbers. Meanwhile, locusts in Somalia moved to the Indo-Pakistan border for summer breeding. The number of locusts continues to increase, and the size of locust swarms continues to grow.

The results showed that, by the end of July 2020, Desert Locust in Pakistan newly harmed about 628.3 thousand hectares of vegetation area, including 340.5 thousand hectares of cropland, 287.8 thousand hectares of grassland, accounting for 1.3% and 3.0% of the total cropland, grassland in Pakistan, respectively. Among them, Sindh Province has the largest damaged area of 442.4 thousand hectares; followed by Punjab, with damaged area of 143.1 thousand hectares; while Baluchistan Province has the least affected areas, with damaged area of 42.8 thousand hectares (Figure 1).

The comprehensive analysis showed that, in August 2020, the number of locusts in southwestern Pakistan will decrease, and locust swarms in Nepal and northern India returning to the Indo-Pakistan border will continue hatching and breeding. The number of locusts on the Indo-Pakistan border will increase. It is expected that the first generation of summer locust swarms will form in mid-August, and the second generation of summer locust swarms will form in September. August to September is the important growing season or harvesting season of crops in Pakistan. If the locusts couldn’t be controlled effectively, the locust plague will continue, which may bring a heavy blow to the agricultural production in Pakistan.

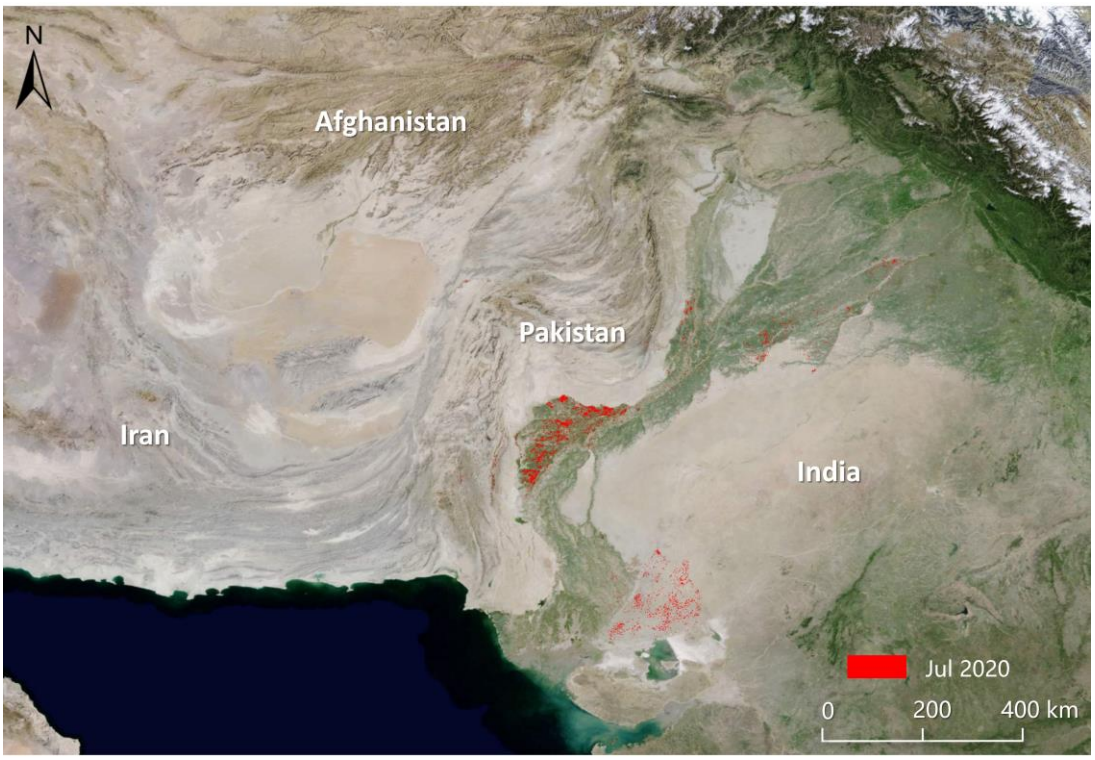

Figure 1 *Monitoring of Desert Locust damage in Pakistan (July 2020)*

Monitoring and assessment of Desert Locust in India

In July 2020, the Desert locusts that migrated from southwestern Pakistan to western India continued to hatch and their populations continued to increase. The locusts continued summer breeding and continued to extend eastward to the northern states of India. A small number of locust swarms migrated to southern Nepal. In mid-to-late July, locust swarms in Nepal and northern India returned to western India.

The results showed that, by the end of July 2020, Desert Locust in India newly harmed about 957.7 thousand hectares of vegetation area, including 510.7 thousand hectares of cropland, 246.5 thousand hectares of grassland, and 200.5 thousand hectares of shrubland, accounting for 0.3%, 0.5%, and 1.1% of the total cropland, grassland, and shrubland in India, respectively. Among them, Rajasthan has the largest damaged area of 643.9 thousand hectares; followed by Haryana, with damaged area of 120.6 thousand hectares; while Madhya Pradesh, Uttar Pradesh, and Gujarat have less affected areas, with damaged area of 92.0, 75.1, 26.1 thousand hectares, respectively (Figure 2).

In this study, Planet data with a spatial resolution of 3 m in July 2019 and July 2020 were also used to monitor the Desert Locusts damage in heavily affected vegetation areas in central Rajasthan, India (Figure 3). The study area is located in the central region of Rajasthan, about 73 km to the west of Jodhpur and about 59 km to the southeast of Bealva. The vegetation types include grassland, shrubland, and cropland, with a total area of 29.0 thousand hectares, including cropland 12.8 thousand hectares, 14.6 thousand hectares of grassland, and 1.6 thousand hectares of shrubland. The monitoring results

showed that, the affected area of vegetation in the study area was 3.6 thousand hectares, accounting for 12.4% of the total area of the study area. Among them, the grassland was affected the most severely with 1.6 thousand hectares, while the affected cropland is 1.5 thousand hectares and shrubland is 0.5 thousand hectares, accounting for 11.0%, 11.7%, and 31.3% of the total area of grassland, cropland and shrubland in the study area, respectively. The results show that Desert locusts can cause great loss to vegetation, and its outbreaks will seriously affect the agricultural production and food security in India.

The comprehensive analysis showed that, in August 2020, locust swarms in western India will continue hatching and breeding, and the number of locusts will increase. It is expected that the first and second generations of summer locust swarms will be formed in mid-August and t September, respectively. August to September is the important planting season, growing season, or harvesting season of crops in India. If the locusts couldn't be controlled effectively, the locust plague will continue, which may bring a heavy blow to the agricultural production in India.

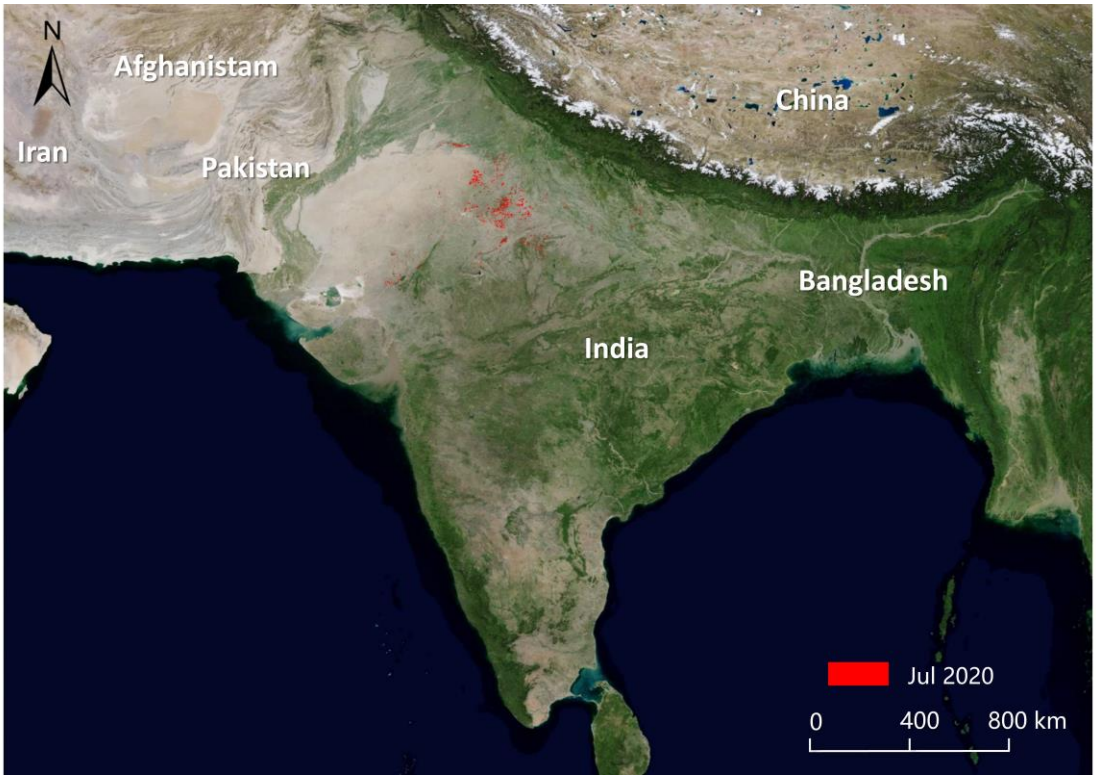

Figure 2 *Monitoring of Desert Locust damage in India (July 2020)*

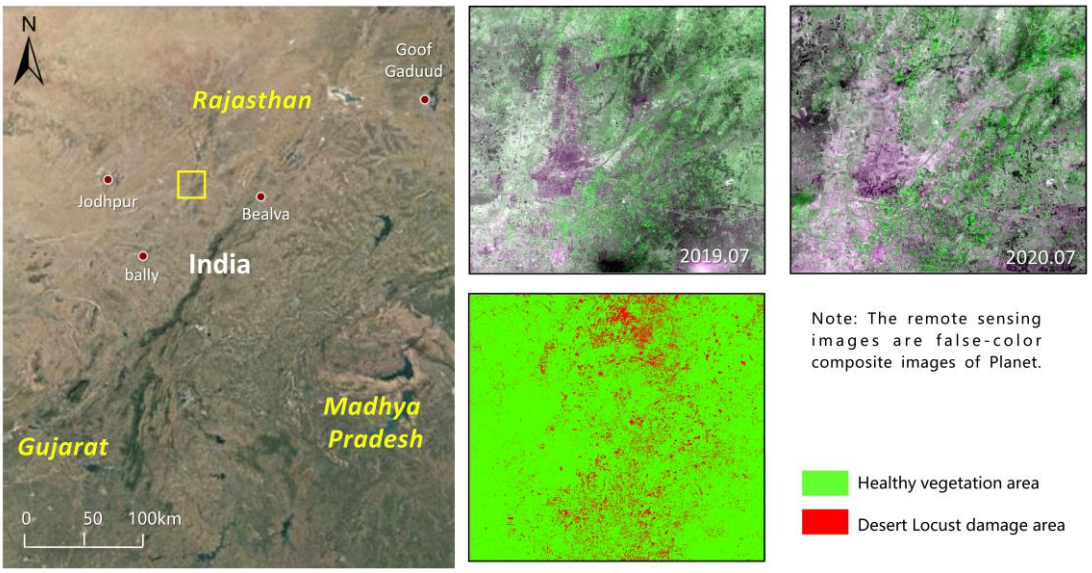

Figure 3 *Monitoring of Desert Locust damage in the key damage area of India based on Planet images*

Monitoring and assessment of Desert Locust in Nepal

In late June 2020, Desert locusts around the Indo-Pakistan border migrated to northern India with strong southerly winds and reached the territory of Bhairahawa in southern Nepal on the border with Uttar Pradesh in India on the 26th, and spread in the central lowlands of Nepal. Some locust swarms reached Butwal and Kathmandu at the foot of the Himalayas on the 27th and 30th respectively. In early July, affected by the southerly wind, locusts on the border between India and Pakistan continued to migrate to Nepal and reached the central plains of Nepal. In mid-to-late July, the locust swarms in Nepal returned to the Indo-Pakistan border.

Monitoring results showed that, by the end of July 2020, Desert Locust in Nepal harmed about 70.1 thousand hectares of vegetation area, including 59.0 thousand hectares of cropland, 7.1 thousand hectares of grassland, and 4.0 thousand hectares of shrubland, accounting for 1.5%, 0.5%, and 0.3% of the total cropland, grassland, and shrubland in Nepal, respectively. Among them, Lumbini District has the largest damaged area of 23.3 thousand hectares; followed by Narayani District, with damaged area of 19.4 thousand hectares; the third is Rabuti District with damaged area of 13.8 thousand hectares; while Janakpur, Bagmati and Perry have less affected areas, with damaged area of 10.9, 1.4, 1.3 thousand hectares, respectively (Figure 4).

The comprehensive analysis showed that, in August 2020, due to the increasing population in the summer breeding area on the Indo-Pakistan border, a small number of locust swarms will migrate to southern Nepal, which is not expected to cause major damage. However, continuous monitoring is still needed to prevent desert locusts from invading Tibet and other regions of China with the south wind.

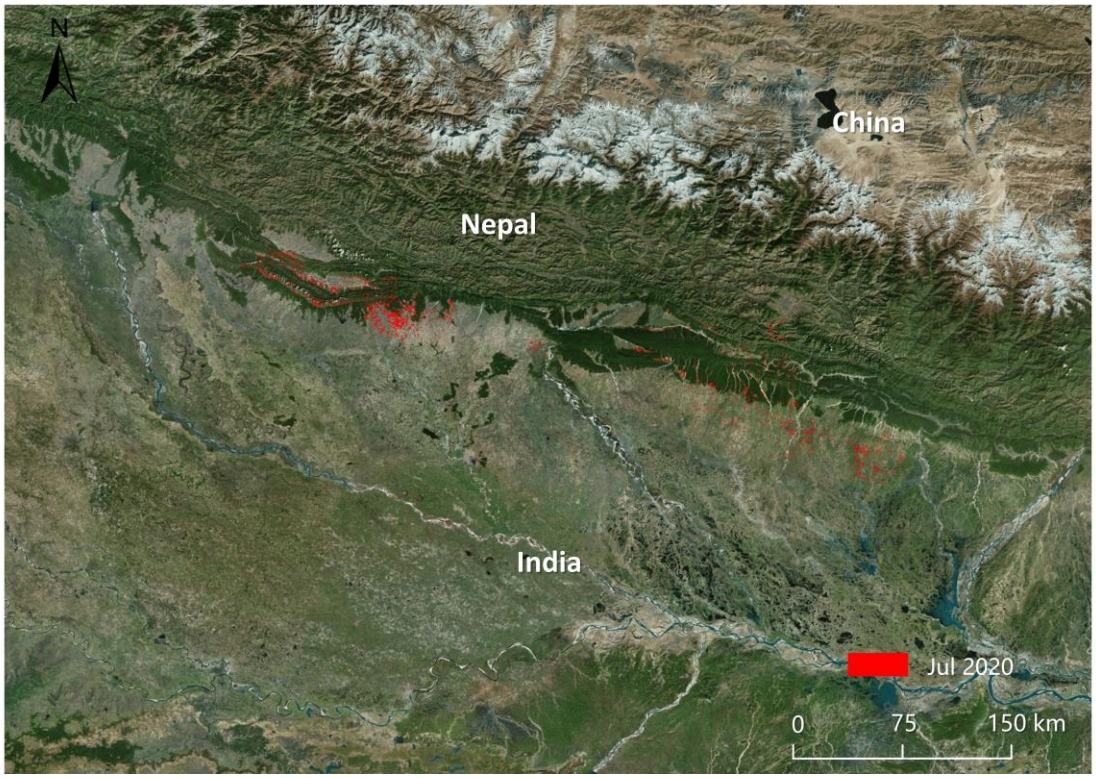

Figure 4 *Monitoring of Desert Locust damage in Nepal (July 2020)*

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Mission statements: As the science and knowledge service, the Sino-UK Crop Pest and Disease Forecasting & Management Joint Laboratory is to support independent evidence for crop monitoring.

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