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

Early November 2020

Desert Locust monitoring and loss assessment in Ethiopia

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 'Vegetation 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 Ethiopia from September to October. The results showed that from September to October 2020, desert locusts in Ethiopia were mainly distributed along the western and eastern edges of the northern Rift Valley, and newly harmed about 1544.0 thousand hectares of vegetation area, including 488.2 thousand hectares of cropland, 410.3 thousand hectares of grassland, and 645.5

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thousand hectares of the shrub. In November, the desert locust will continue breeding and will migrate north to the east, then is expected to reach northeastern Kenya in December. The period from November to December coincides with the important crop harvest season and planting season in countries of the Horn of Africa. If not properly controlled, locusts will bring a major threat to agricultural and pasture production. It is necessary to continue the monitoring and early warning of the 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 Ethiopia

In September 2020, the desert locusts in Ethiopia were mainly located along the western and eastern edges of the northern Rift Valley. The locusts continued to reproduce, lay eggs, hatch and mature, and the number of locusts continued to increase. The results showed that, by the end of September 2020, desert locust in Ethiopia harmed about 1107.1 thousand hectares of vegetation area, an increase of 776.7 thousand hectares compared with August 2020 (including 214.7 thousand hectares of cropland, 282.1 thousand hectares of grassland, and 279.9 thousand hectares of shrub) (Figure 1). In October, the locust swarms in northern Ethiopia gradually dispersed to the eastern Somali State, and continued to reproduce and lay eggs. As the locust swarms matured and the population continued to increase, some locust swarms began to migrate to central Somalia. The results showed that, by the end of October 2020, desert locust in Ethiopia newly harmed about 767.3 thousand hectares of vegetation area, including 273.5 thousand hectares of cropland, 128.2 thousand hectares of grassland, and 365.6 thousand hectares of the shrub (Figure 2).

The results showed that, from September to October 2020, desert locust in Ethiopia newly harmed about a total of 1544.0 thousand hectares of vegetation area, including 488.2 thousand hectares of cropland, 410.3 thousand hectares of grassland, and 645.5 thousand hectares of shrub, accounting for 2.0%, 2.3% and 0.9% of the total cropland, grassland, and shrub, respectively. The affected areas are mainly located in the northern part of Oromiya (with affected area of 618.5 thousand hectares), western and southern Afar (with affected area of 356.2 thousand hectares), and northern Somali (with affected area of 265.8 thousand hectares), the eastern part of Amhara (with affected area of 205.2 thousand hectares), the southern part of Tigray (with affected area of 96.7 thousand hectares). While the Southern Nation, Tribe and People State (SNNPR) had less affected areas as 1.6 thousand hectares.

We also used Sentinel-2 remote sensing images to monitor desert locust disasters in the more severely affected areas at northern Ethiopia. The data acquisition time is October 2020, and the spatial resolution is 10m. The study area is located at the junction of the western part of Afar State and the southeastern part of Tigray State, about 66 kilometers northwest of Ethiopia's second largest city, the capital of Tigray State, Mek'ele, and about 46 kilometers southeast of Gaibu. The total area of the study area is 624.3 thousand hectares. The vegetation types in the study area include cropland, grassland and shrub, with the areas as 208.7 thousand hectares, 52.1 thousand hectares, and 363.5 thousand hectares, respectively. The monitoring results showed that, in October 2020, the affected area of vegetation in the study area was 78.9 thousand hectares, accounting for 12.6% of the total area of the study area. Among them, the shrub was affected most severely with 43.1 thousand hectares, while the affected areas of cropland and grassland are 29.6 thousand hectares and 6.2 thousand hectares, accounting for 11.9%, 14.2%, and 11.9% of the total area of shrub, cropland and grassland, respectively (Figure 3). The results of the study show that desert

locusts have caused huge damage to Ethiopia's vegetation, and continuous monitoring of the locust situation is needed to ensure Ethiopia's agricultural production and food security.

The comprehensive analysis showed that, in November 2020, Ethiopia's desert locusts will continue to reproduce. The locust swarms in the north will migrate north to the eastern coast of Eritrea, south to the southern Rift Valley, and east and southeast to eastern Somali and central Somalia. As the locust swarms in Somali continue to mature, the epicentre of locust populations in Ethiopia will shift from the north to the east, and the population will further increase. At the same time, some locust swarms in eastern Somalia will also migrate south to eastern Ethiopia. It is expected that the locust swarms will migrate south to northeastern Kenya in December. November to December is the important harvest season of crops in Ethiopia. If the locusts couldn't be controlled effectively, the locust plague will continue, which may bring a heavy blow to the agricultural and pasture production in Ethiopia.
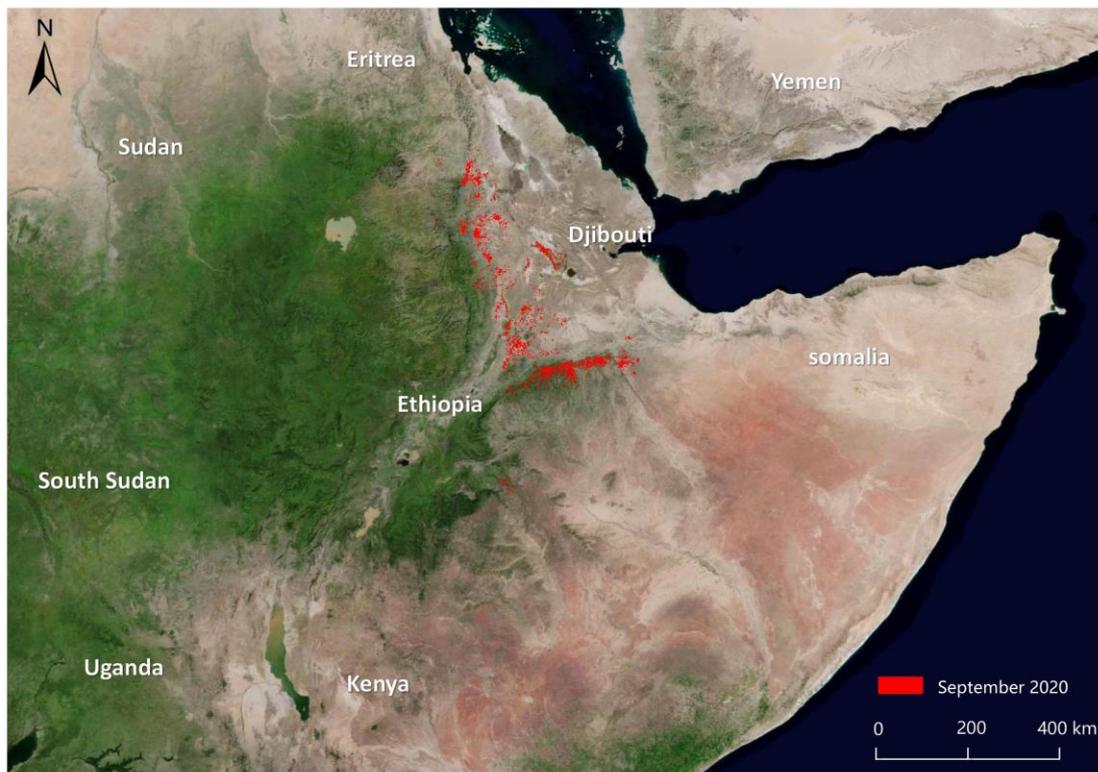
Figure 1 Monitoring of Desert Locust damage in Ethiopia (September 2020)
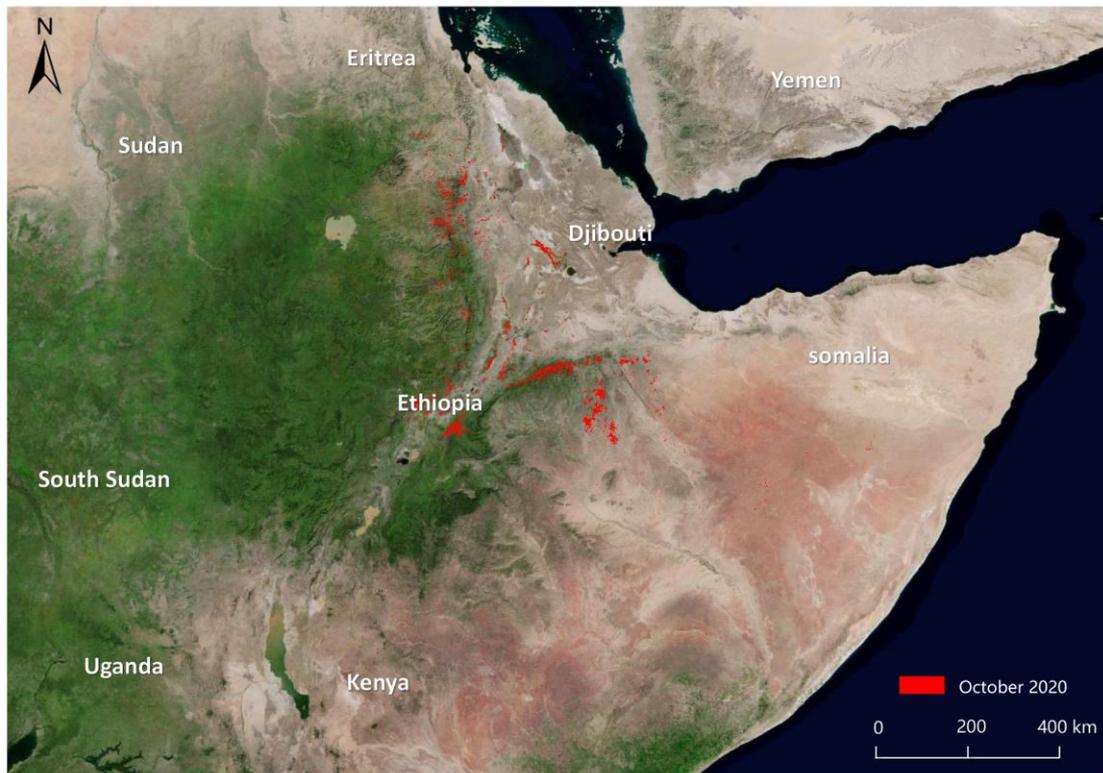
Figure 2 *Monitoring of Desert Locust damage in Ethiopia (October 2020)*
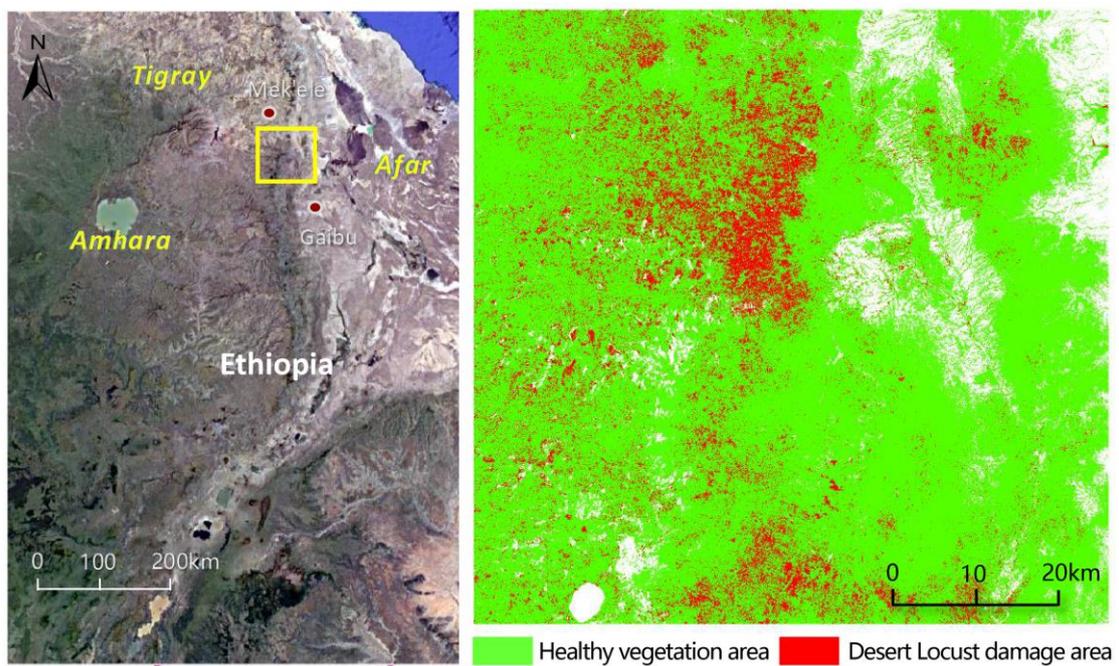
Figure 3 *Monitoring of Desert Locust damage in the key damage area of*

India based on Sentinel-2 images (October 2020)

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