Desert Locust Control Organization for eastern Africa
(DLCO-EA)

Call for Applications

International Consultant to measure the Effects of Climate/Weather Extremes and Socioeconomic Variables on the Distributions of Desert Locust in Eastern Region of Africa, and Develop an Integrated Forecasting Model for Locust Outbreaks

[Deadlines for submission of application: 25/02/2022]

DLCO-EA is seeking services of a Consultant, experienced in developing climate scenarios and models to improve predictions of climatic and socioeconomic variables on the distribution of Desert Locust, focusing on migration patterns, shits of breeding sites, etc.

Interested applicants are invited to submit their application including a CV and a cover letter to DLCO-EA using the following e-mail address:

osdlcoea@hotmail.com

Mobile No +251911872281
Dr. Osman M. Abdalla
Chief Research Officer
DLCO-EA
Addis Ababa
Ethiopia

Consultant Fees $ 9,000 - 3 months ($ 3,000 p.m. month)

The Consultant will be working closely with Operational Research Division (DLCO-EA)

Background

The outbreaks of the Desert Locust (*Schistocerca gregaria* Forskål), when they occur in plague numbers, can infest vast areas. Such plagues are characterized by the presence of many hopper bands and swarms that cause considerable economic losses and lead to a sharp reduction in subsistence crops and grazing pastures. Desert Locust is considered to be a catastrophic pest for about 50 countries in Africa, the Middle East and southwest Asia. On other hand, they move between 25 countries in the recession area, central part of the distribution area that extends from Mauritania to north-western India.

Desert Locusts breed in areas that have received enough rain (usually at least 25-50 mm) to provide moisture for egg laying, development and for vegetation to grow or regenerate and provide food and shelter for hopper development. Successful breeding of Desert Locust requires a considerable degree of coincidence of adult locusts and rains both in time and space. Desert locust outbreaks occur when rains are sufficiently heavy and prolonged for two generations to breed, this allows a rapid rise in numbers and density followed by the onset of gregarious behaviour. However, plagues may occur only when locusts breed frequently and successfully over a period of one or more years.

Change in the climate system caused by different natural and manmade climate change make locust plagues more likely. The 2019-2021 desert locust upsurge in eastern Africa, was likely exacerbated by shifts in rainfall patterns and intensity, as well as high cyclone activities in late 2019. Due to higher than usual average temperature, conditions for desert locust become more conducive to plague development in recent years. However, occurrence of climate changes is evident from increase in global average temperature, changes in the rainfall pattern and extreme climatic events. Studies have shown that these seasonal and long-term changes would affect the fauna, flora and population dynamics of insect pests. Also, it has been assumed that if there's an increase of temperature under climate change scenarios simultaneously there might be an increase of the rainfall. In this case, locusts might be able to get an extra generation of breeding in before the habitat becomes unfavourable. If the latter proves to be the case, this may lead to increase frequencies of outbreaks of the Desert Locust.

The most recent upsurge of Desert Locust in eastern Africa can be linked to the anthropogenic climate change and increased frequency of extreme weather events. In May 2018, an unusual tropical cyclone (Mekunu) caused heavy rainfall that created favourable condition for Desert Locusts to develop and breed over the “Empty Quarter” in Saudi Arabia. Another tropical cyclone (Luban) followed in October, 20118, which expanded the continuation of the first outbreak. This outbreak spread to Yemen where it remained uncontrolled due to political instability in the country. By the end of 2019, the winds of yet another tropical cyclone, (Pawan), facilitated the migration of the Desert Locusts to east Africa. A lack of preparedness, political instability and limited resources made the invasion the worst in the eastern region of Africa. Moreover, the prolonging period of north and north-westerly winds in Saudi Arabia, Yemen, Sudan, Eritrea, Ethiopia and Somalia aided in migrating the Desert Locust south and south-westward to Kenya in late November, 2019.

The existing forecast methods for Desert Locust outbreaks that relies heavily on four main factors (temperature, rainfall, vegetation and winds) have shown limitations to cope with such climate and whether extremes that to large extents are linked to socioeconomic development, mainly unsustainable consumption and production, including industrial development patterns. To address such limitations, DLCO-EA is seeking services of a consultant, experienced in developing climate scenarios and models to improve predictions of climatic and socioeconomic variables on the distribution of Desert Locust, focusing on migration patterns, shits of breeding sites, etc.

Objectives

The general objectives of this work to which the services of the consultant is being sought is to study the combined of impact of climate extremes and several socioeconomic factors on the population dynamic of Desert Locust and to develop a localized forecasting model to improve our locust management strategies.

The specific objectives are to investigate climate scenarios, other selected environmental and socioeconomic changes and their impact on distribution, movements and population dynamics of Desert Locust. The following are among such changes and variables:

1. Climate and weather variables:

a. Temperature
b. Rainfall
c. Humidity.
d. Cloud cover.
e. Mean temperature
f. CO_2
g. Wind
h. Photoperiod

2. Other environmental variables

i. Ecosystem (Vegetation Status, cover, type and compositions)
j. Soil type & topography

3. Socioeconomic variables

k. Farming/agricultural industrialization/expansion
l. Rate of urbanization. Food insecurity
n. Extent of grazing

Activities

1. Data collection covering all relevant variables including climate/weather extremes, environmental and socioeconomic changes for the past 30 years

2. Analysis of the data, interpretation of the result and developing of an integrated forecasting model taking into account climate/weather, other environmental variables and socioeconomic variables including those outlined in the early sections.

TIME FRAME:

It is foreseen that the study will take three months; the following work plan is for whole duration of the study.

No.	Activities	Timeframe	Remarks
1.	Collection of data on distribution, movements, and breeding sites of Desert Locust in relation to basic variables of climate scenarios (temperature, rains, and winds) for the last 30 years in East Africa,	March-April,2022	Sudan, Eritrea, Somalia, Ethiopia, Djibouti
2.	Statistical analysis, interpretation of the results and developing a forecasting model.	March-April,2022	Ongoing through end
3.	writing of the progress report	April-May,2022	End of the study and
4.	Completion of the study t		Submission of the final report

EXPECTED OUTPUT

1. Knowledge on impact of climate change scenarios on Desert Locust distribution, socioeconomic and on population dynamic will be verified.

2. A regional forecasting model is developed.